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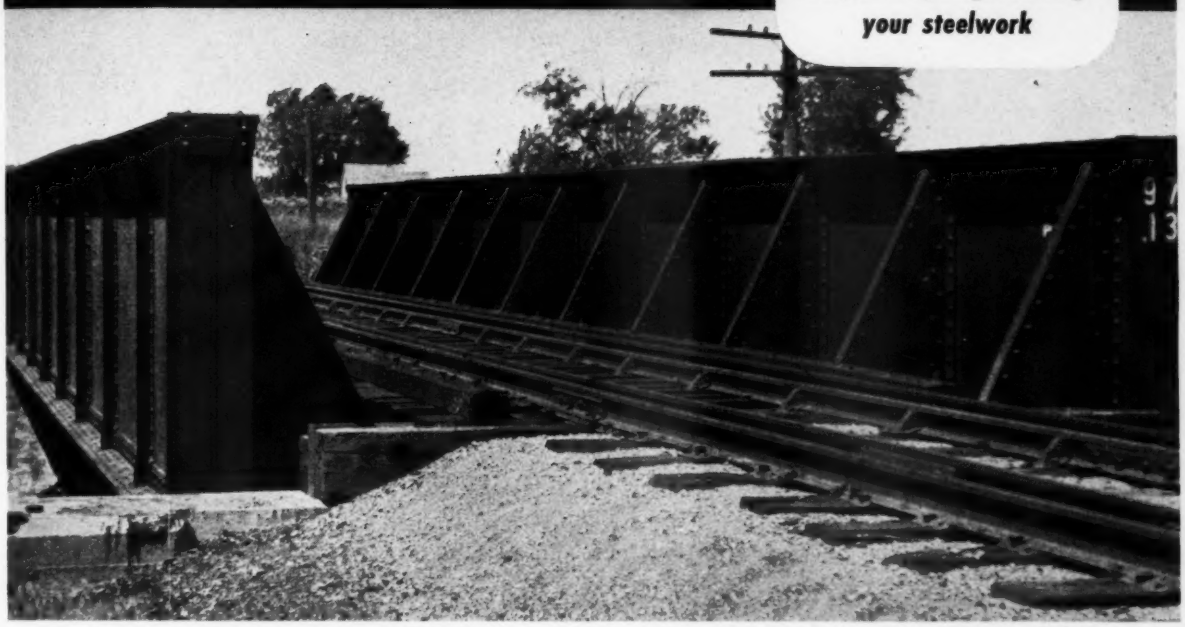
SAVE 50% on MAINTENANCE

By using a rust preventive that does not require thorough cleaning, it is possible to save from 50% to 85% in protecting your steelwork



NO-OX-ID CAN BE APPLIED DIRECTLY OVER RUSTED STEEL SURFACES

When you use NO-OX-ID on your steelwork you can save at least half the cost of maintenance work, for expensive, thorough cleaning is unnecessary. All that is required is to remove the loose rust scale and apply a single coat of NO-OX-ID "A Special." Heavy rust scale should be broken up to accelerate the penetrating action.

NO-OX-ID penetrates through rust to the parent metal where it arrests further corrosion. This penetrating action facilitates removal of rust scale and makes cleaning inexpensive after the NO-OX-ID has had an opportunity to do its work. This penetrating action requires from 12 to 18 months. Then, a final touching up of the scattered bare spots will prevent further loss of metal.

NO-OX-ID applied on new steel forms a lasting protective film. In one to three years after NO-OX-ID "A Special" has been applied, a finishing coat of NO-OX-ID Gloss Filler Black or Red may be used. Then, if desired, the structure may be painted.

NO-OX-ID Rust Preventive has been found to be the most effective method of preventing rust, stopping the loss of metal, and thus retaining the safety factor of bridges and steel forms.

NO-OX-ID Provides Two-Way Protection Against Rust

MECHANICAL PROTECTION

NO-OX-ID forms a plastic film over the surface of the metal that will not crack. Consequently, moisture, oxygen, and other corrosion accelerators are effectively kept out.

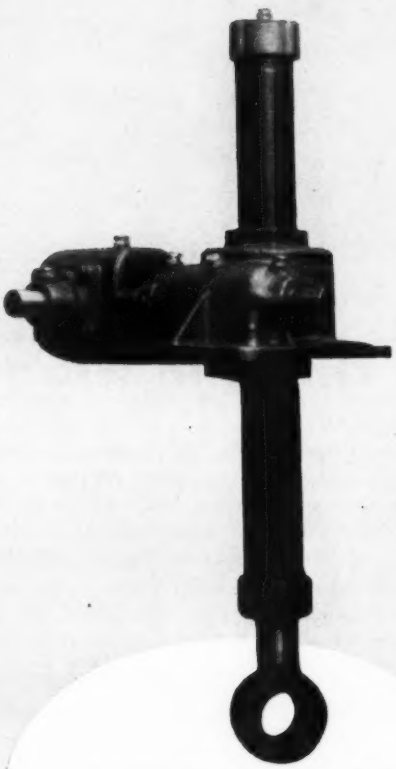
CHEMICAL PROTECTION

NO-OX-ID contains rust-inhibiting chemicals which immediately stop any underfilm corrosion and pitting that may be present on the metal when the coating is applied.

DEARBORN CHEMICAL COMPANY
Dept. U, 310 S. Michigan Ave., Chicago, Ill.
New York • Los Angeles • Toronto

NO-OX-ID
IRON + OX = RUST
TRADE MARK
The Original Rust Preventive

8 inch field howitzer as used by the United States Army. Used for demolition of fortified positions. Gun mount and traveling carriage equipped with TIMKEN Tapered Roller Bearings.



Superior Special No. 250 Railway Jack equipped with TIMKEN Tapered Roller Bearings. Manufactured by Superior Railway Products Corporation, Pittsburgh, Pa.

No matter what kind of equipment you buy, if it contains TIMKEN Roller Bearings you will receive the same efficient, enduring service that TIMKEN Bearings are giving in America's defense armament—in guns, tanks, trucks, armored cars, airplanes and warships.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

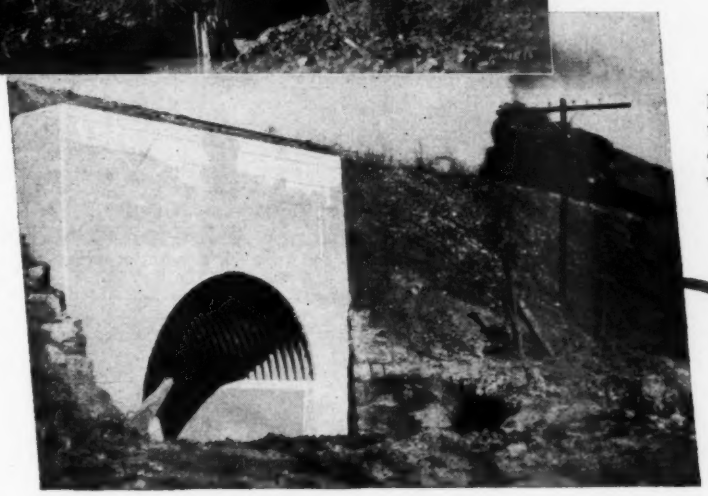
TIMKEN

TAPERED ROLLER BEARINGS

HEED THE WARNING IN EXCESSIVE MAINTENANCE

MENACE

REPLACE UNSOUND BRIDGES THIS QUICK EASY WAY



Relining this old arch structure with ARMCO Multi Plate stopped excessive maintenance. A new headwall completed the installation.

Bridges that continually must be repaired are a menace to your budget. To rid your mind of this worry, replace these unsafe bridges with ARMCO Multi Plate. It is quick, easy and economical.

Your regular crew can erect a Multi Plate structure in any season. The rugged plate sections are assembled on the job and backfilled with earth. No special equipment is required and, if necessary, the work can be done without interruption or inconvenience to traffic. Once in place, Multi Plate will serve for years without maintenance. Galvanized ARMCO Ingot Iron assures material durability and the extra-large corrugations are designed to withstand heavy loads and sudden impact.

Start now to eliminate recurring maintenance on old bridges. By replacing or relining with ARMCO Multi Plate you will save on upkeep and have a structure that fully meets high speed traffic conditions. Call our nearest office or write us direct. Armco Railroad Sales Co. Inc., 2151 Curtis St., Middletown, O.

MULTI ARMCO PLATE

ARMCO MULTI PLATE

A TYPE OF PRODUCT ORIGINATED AND DEVELOPED BY ARMCO ENGINEERS

TO RAILWAY SUPPLY MANUFACTURERS

"We're Getting Ours Too"

"Boss, the railways are certainly spending a lot of money these days," said the star railway salesman to his railway sales manager.

"They certainly are, Bill," replied the railway sales manager. "It seems like old times."

"But what gripes me, Boss, is that it's all going for cars and locomotives."

"Is that so. Where do you get that idea?"

"Why, every newspaper I pick up reports more orders for equipment."

"That's true, Bill. They've ordered more cars and locomotives in the last 12 months than in any year since 1929. But that doesn't mean that they're not ordering more of other materials, too."

"Do you mean to say that they're ordering more roadway and bridge and building materials, too?"

"That's exactly what I mean. Aren't we getting a lot more business this year?"

"Yes, I know we are but—"

"And aren't most of the other companies in our field doing the same—at least the up-and-coming ones?"

"I guess they are, Boss, but—"

"And don't you realize that in the first four months of this year the railways spent $16,000,000 *more* for the maintenance of their tracks and structures than in the same months of last year. That's an increase of nearly 12 per cent."

"I didn't realize it was anywhere as large as that."

"And what's more, Bill, this *rate of increase*, is rising as the roads get into the active working season. The last figures I have are for April and the increase for maintenance of way and structures in that month over April of last year was $5,795,000."

"Gee, Boss, that increase alone is at the rate of $26,000 a working hour."

"And don't forget that more than half that is going for materials. And don't forget also, Bill, that these figures don't include all those expenditures for improvements charged to capital account. They always increase still faster in an expanding market."

"You think we're going to get our share of this money then, do you, Boss?"

"It's your fault and mine, Bill, if we don't. Never forget this fact, Bill, that when the railways have money to spend, they spend it for all the things that go to make up a railway and not merely for the things that you see noted in the newspapers."

"In other words, Boss, when we read that the railways are buying a lot of cars and locomotives, we can be sure that they're buying track materials and roofing and pipe and all the other materials too."

"It's a sure bet, Bill. They always do."

"That makes me feel a lot better, Boss. I'm going back to work with a lot more confidence. And what about our advertising in *Railway Engineering and Maintenance?*"

"We're continuing it, of course. And I'm thinking of running an extra page now and then to help us grab off some of the business that the X Company's been carrying. I hear they think that the roads are spending all their money for cars and locomotives and I want to get this business before they wake up."

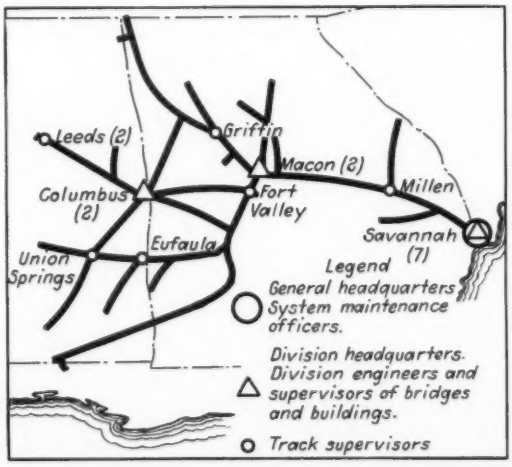
"That's smart, Boss. That advertising will help. That magazine goes all through my territory. I find it everywhere. You remember that last ad we ran. That was a dandy. When I was down on the Central of Georgia last week, everybody was talking about it."

"They saw it then?"

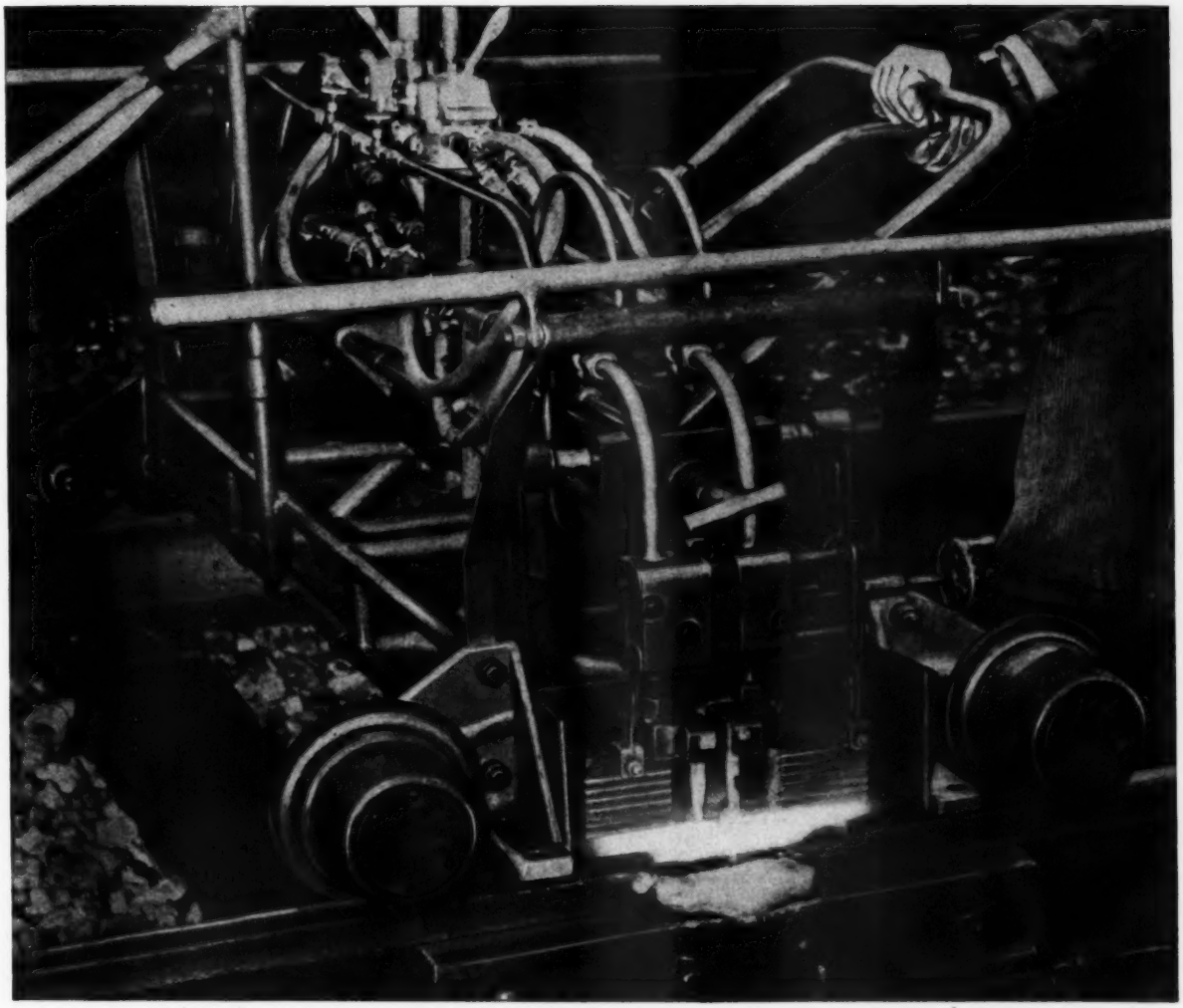
"Saw it! Why, Boss, they all read it. You know that on that road the general manager, the chief engineer, the engineer bridges and buildings, all three division engineers and every supervisor get that paper—and a lot of their assistants too. Those men look for our ad every month."

"That's great, Bill. It's the best possible set-up to supplement your efforts and mine. It's essential to our success."

Railway Engineering and Maintenance Goes Every Month to the **General Manager (in Charge of Maintenance)**, to the **Chief Engineer**, to the **Engineer Bridges and Buildings**, to the **3 Division Engineers**, to the **6 Supervisors of Track** and to **19 Foremen and Other Subordinate Maintenance Officers** Who Are in Training for Promotion to Supervisory Positions on the Central of Georgia.



RAILWAY ENGINEERING AND MAINTENANCE IS READ BY MAINTENANCE OFFICERS OF ALL RANKS



OXY-ACETYLENE END-HARDENING
Produces A Batter-Resistant Rail-End

• Rail ends hardened by the Oxweld method are uniformly within the hardness range established as most effective for resisting batter. When applied to new rail in track this procedure makes possible substantial savings in joint maintenance. The Oxweld rail end-hardening method, including the equipment used to apply it, is kept up-to-date and efficient by Oxweld engineers. This service is one of many which Oxweld has made available to the railroads to help achieve efficiency and economy in oxy-acetylene operations.

THE OXWELD RAILROAD SERVICE COMPANY
Unit of Union Carbide and Carbon Corporation
UCC
Carbide and Carbon Building Chicago and New York

OXWELD RAILROAD SERVICE

SINCE 1912—THE COMPLETE OXY-ACETYLENE SERVICE FOR AMERICAN RAILROADS

The word "Oxweld" is a registered trade-mark of a Unit of Union Carbide and Carbon Corporation.

5 MEN INSTALL THIS 90-INCH CULVERT

—in 4 days!

WITH U·S·S SECTIONAL PLATES

REPLACING A SMALL BRIDGE with a 90-inch culvert built from U·S·S 7-gage Sectional Plate. Installed by Young and Greenawalt.

THIS 90-inch corrugated metal culvert replaced a failing bridge under the main line of a western railroad. The entire job — excavation, plate erection, backfilling, removal of old caps, stringers, and handrail, and placing the rip-rap headwalls—was finished in four days without stopping traffic.

This shows how U·S·S Sectional Plate construction saves time and money. A few men—and they don't need to be highly skilled—can install a culvert as strong as a small bridge. The installation was inspected carefully a year and a half after erection and found to be in perfect condition.

What's more, the cover over the pipe is small so that the top of the culvert takes a severe pounding every time a train goes over it. If highway or railway engineers have any doubts as to the strength and resistance to impact of large corrugated culverts, this, and other installations like it, should dispel any fears.

We'll gladly give you all the details of this job or answer questions about your own problems. Just write.

CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*
COLUMBIA STEEL COMPANY, *San Francisco*
TENNESSEE COAL, IRON & RAILROAD COMPANY, *Birmingham*
Scully Steel Products Company, Chicago, *Warehouse Distributors*
United States Steel Export Company, New York

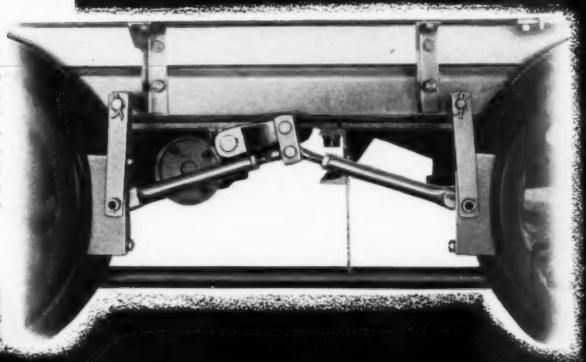
USS

UNITED STATES STEEL

Designed FOR SAFETY

Strong safety railings at the front and the rear of every Fairmont motor car provide ample protection.

Lift handles, extending either front or rear, provide the extra leverage needed to reduce the lifting weight to the minimum. The rear lift of the 4-man M19 Series E car, shown at the right, is thus reduced to only 95 lbs., which makes it easily handled by one man.



Powerful four-wheel brakes with threaded toggles for equalizing the pressure on both sides of the car, assure quick, safe stopping. Rail skids between the front and rear wheels simplify sliding the car over high rails.

AN important reason for the widespread popularity of Fairmont Railway Motor Cars is the extra margin of safety which they provide for the men who use them. Rugged construction, the use of weight-saving, high-strength aluminum alloys, and special features of design such as safety rails, foot guards, extension lift handles, four-wheel brakes, and rail skids assure maximum protection for passengers and quick, safe removal of cars from tracks in emergency. The greater power of Fairmont equipment saves time and gets more work accomplished in a day. Fairmont cars are available in many types, including inspection, section, and gang cars in a broad range of sizes to meet every hauling requirement. Write for the new Fairmont catalog. Fairmont Railway Motors, Inc., Fairmont, Minnesota.

Fairmont

Performance ON THE JOB COUNTS

FAIRMONT M19 SERIES E. Seats 4, easily handled by 1. Rear lift 95 lbs. 5 to 8 h.p. Fairmont Hy-load roller bearing engine.

OF ALL THE CARS IN SERVICE TODAY ★ ★ *More Than Half are Fairmonts*

No. 151 of a series

Railway Engineering and Maintenance

SIMMONS-BOARDMAN PUBLISHING CORPORATION

105 WEST ADAMS ST.
CHICAGO, ILL.

July 1, 1941

Subject: Building for the Future

Dear Reader:

As many, probably most, of you are engaging in larger programs this summer, you are facing a problem that is largely new, for the last 10 years at least. I am thinking of the necessity for your going out and looking for the additional men that you need for your added work. For a decade you have had furloughed men on whom you called; now these men are working and you need still more men. As you are now hiring these new men, I am wondering how largely you are concentrating on your immediate needs and how much thought you are giving beyond this to the value of these men to your railway as permanent employees and to their potentialities for promotion to supervisory positions later.

All too frequently in these days we lose sight of the fact that the calibre of the supervisory personnel of the next 10 or 20 years is determined by the ability of the men we employ in the ranks today. Yet, more largely than in most other industries, the railways "make" their own officers. This fact provides the hope for young men in railway service. At the same time it places an added responsibility on those of you who have the authority to hire.

Railway employment affords many attractions to young men with red blood. It is an industry of action. Its work is out of doors. In general, employment is steady – pay is certain – and tenure of position for the efficient is surrounded with many safeguards. These are considerations which a supervisory officer can point out to desirable young men. To fail to do this is to become remiss in his responsibility.

The time has come when supervisory maintenance officers should give more consideration to the personnel of their gangs. Instead of "hiring any man who comes along", they should contact young men from the rural high schools and other channels who would make desirable men and interest them in railroad work, leaving this matter no longer to chance. Through such measures, a supervisory maintenance officer can lighten his own load – equally important, he can aid his management in strengthening the personnel of his railway and can start capable young men on careers of large possibilities. Am I right?

Yours sincerely,

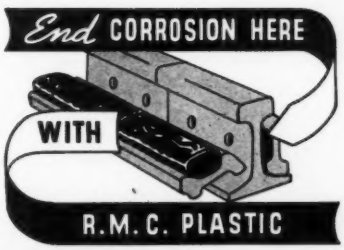
Elmer T. Howson

ETH:EW

Editor

MEMBERS: AUDIT BUREAU OF CIRCULATIONS AND ASSOCIATED BUSINESS PAPERS, INC.

Eliminate A BIG FACTOR



that INCREASES COST and SLOWS UP MAINTENANCE

LEFT: Showing the method of placing moulded blocks of plastic preservation on joint bars before application to rail.

CENTER: Joint bars are applied in the conventional manner.

BELOW: Joint bars are bolted to rail. Note how the high pressure, as bolts are tightened, squeezes the preservative to all points in the splice. A positive seal against corrosion agencies.

Rail Joint Corrosion

should not be tolerated when it can be so economically avoided by R.M.C. PLASTIC.

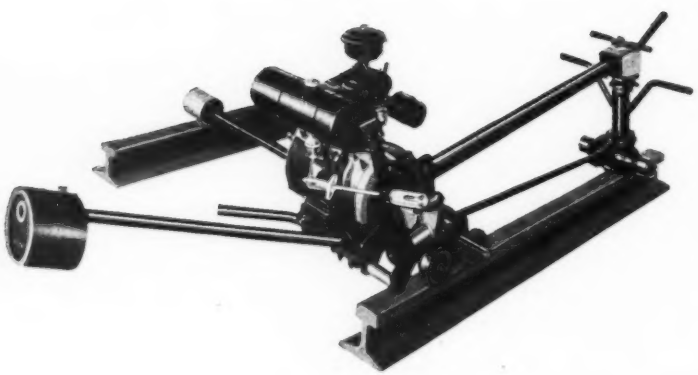
This *exclusive* metal preserving and lubricating compound, furnished in moulded blocks, is applied as shown in the illustrations. When bolted up, the joint is *solidly packed* and protected against brine and other corrosion agencies.

THE RESULT: No "frozen" joints—Extended life of rail, bars, fastenings—Longer interval between joint renewals—Faster renewals—Reduced end batter—No kinked and humped track. Tomorrow's traffic will be still heavier, and harder on track. Why not start now to minimize future joint maintenance problems? Just call a Rail Joint Company representative, or write us and learn how little R.M.C. PLASTIC protection costs.

RAILWAY MAINTENANCE CORPORATION

PITTSBURGH **PENNSYLVANIA**

Lightweight
Accurate
Dependable
Fast



Raco Power Track Machine

On 57 railroads throughout the country Raco Power Track Machines have established **remarkable service records.**

Its counterbalanced operating head, self-centering chucks, convenient and easy controls, and the fact that it pushes or pulls along level rail with a pressure of only 10 pounds, insure **one-man operation** and make for **maximum speed** with **minimum fatigue of operator.**

Since it weighs **only 400 pounds,** without counterbalance weight, it can be readily removed from the track by **two** men.

Automobile type construction and the employment of modern Chrome, Vanadium and Molybdenum alloy steels, **insure against** excessive breakdowns and service interruptions.

The Raco Micro Cut-Out insures an **equal pre-determined power** applied to every nut.

RAILROAD ACCESSORIES CORPORATION

Main Office
137 East 42nd Street
(Chrysler Building)
New York

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PRINTED IN U.S.A.

Railway Engineering and Maintenance

NAME REGISTERED U. S. PATENT OFFICE

JULY, 1941

Four operations on this rail laying job were done with the aid of six NORDBERG POWER TOOLS

Removing joints from old rail

Pulling the spikes

Preparing tie seats for new rail

Tightening joints of newly laid rail

Here is a completely mechanized rail laying gang equipped to do a better job of track work in less time and at lower cost. This medium-sized organization is typical of the practice followed by railroads that have replaced hand operations with Nordberg Power Tools. At the head of the gang is a Power Wrench for removing nuts from the bolts of the old rail. Then come two Spike Pullers followed by two Adzing Machines, while at the rear is another Nordberg Power Wrench uniformly tightening the joints of the newly laid rail. These machines speed up the job and get track back into service sooner. They release men for other jobs. They are quickly paid for by labor savings alone. More important, however, is that with these tools it is possible to maintain the higher track standards demanded by heavier and faster traffic. A track laying gang that is Nordberg equipped is efficiently equipped.

There Are Twelve Nordberg Tools For Your Maintenance Jobs

Adzing Machine	Spike Puller
Power Wrench	Power Jack
Six Grinders	Rail Drill

Track Shifter

NORDBERG MFG. CO.
MILWAUKEE, WISCONSIN
Export Representative
WONHAM, Inc., 44 Whitehall Street, New York City

Railway Engineering and Maintenance

Freight Progress

A Remarkable Record of Achievement

WITHIN the last seven years the railways have made the most remarkable improvement in their passenger service that history has ever recorded. Streamlined trains of new lightweight materials, air-conditioned, providing a degree of comfort and traveling at speeds unthought of as recently as a decade ago, have ushered in a new era of service that has won wide popular favor. In fact, the term streamline, that was first employed to designate these new trains, has now become the synonym for the new and ultra-modern in many walks of life.

But railway progress is not confined to passenger service. It is equally as marked in freight service and, while not as dramatic or appealing to the eye, is in reality a greater contribution to the industrial life that is making our country the power that it is. This development is also more widespread in its influence and more far-reaching in its importance. For this reason it is important that every railway employee have a proper appreciation of the progress that is being made by the industry of which he is a part in its freight service.

Speed is the Keynote

As with passenger service, improvement in freight service today is measured first by the patron in terms of speed. We are living in an age of speed and, whether we like it or not, we must recognize that the public demands greater and still greater speeds in the handling of its freight traffic just as positively as in passenger service. As a result, the railways have made outstanding reductions in schedules during recent months. One of the most spectacular has been the elimination of an entire day in the schedules from the Pacific Coast to Chicago, bringing these areas that much closer together. The schedule between South Florida and New York City has been similarly shrunken, with the result that these areas have also been brought that much closer together. And elsewhere throughout the country schedules between distant points have been correspondingly shortened.

Equally noteworthy has been the extension of the fast overnight schedules between important jobbing centers, until first morning delivery is now common at points 450 to 500 miles distant. To give such service character, and increase public interest, many of the railways are giving their trains names, such as the Speed Witch, the Blue Streak, and the M.S. 1.

No small part of this shortening of schedules is made possible by the activities of maintenance of way forces. By reason of the increased strength that they have built into their tracks and structures, and by the refinements that they have introduced into their workmanship, they are today providing a roadway capable of carrying these heavy trains with an even greater safety than a decade or two ago. They have rebuilt water and coaling stations to reduce delays here to a new minimum. They are in the early stages of a far-reaching program of curve reduction that has for its purpose the elimination of speed restrictions for freight as well as passenger trains. And they are coming rapidly to recognize that a "slow order" is inconsistent with the tempo of today to the degree that they are revising their methods of working to replace track-mounted work equipment with units that work independently of the track.

Dependability is Vital

Secondary in importance only to speed is dependability of freight service. Here the improvement has been so gradual, but nevertheless so steady, that few, even in the maintenance of way department, are aware of the progress that has been made. Through closer supervision of train operation, through greater care in preparing schedules and through the elimination of potential sources of delay, trains are kept moving today. The extent to which dependability is now provided as a matter of course is illustrated by the record of a railway which operates through particularly adverse mountain country, which found on a recent check that more than 90 per cent of a total of 5,200 symbol freight trains had moved on time within the last year.

And freight service is also undergoing great improvement from the standpoint of meeting the convenience of the shipper. No longer is he required to bring his shipments to the freight house and carry them away, for the railways' service extends to his warehouse or shipping platform. Through pick-up and delivery service, the shipper now has the convenience of one agency, the railway, for the entire movement. And a further result is to hasten materially the delivery of the freight at the consignee's receiving platform.

Of equal or even greater importance to many shippers, especially at intermediate or branch line points, is the co-ordination of highway with rail services, whereby

trucks deliver to these smaller points freight that, under earlier methods, would reach these towns only after a day or more delay passing through transfer stations for way freight handling. By means of this co-ordinated truck service, the railways are giving thousands of smaller communities service comparable with that received by the larger centers.

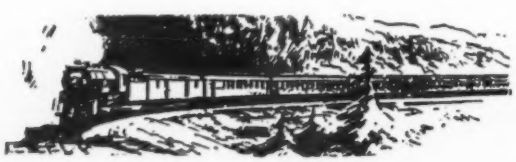
In these and numerous other ways the railways are today providing a service that is more closely keyed to the shipper's needs than ever before. And the shippers, through the 13 regional advisory boards, are extending to the railways a degree of co-operation never before contemplated. As a result, through co-operative action of the highest order, a standard of service is being provided of which every railway employee may be proud.

Work Equipment

May Prove the Deciding Factor Again

CURRENT maintenance programs are now expanding to new peaks since 1931 to meet the increasing demands on the physical plant of the railways. At the same time the loss of experienced men is increasing, as the result of calls to military service and the attractions of higher rates of pay in many other industries. Facing these conditions, work equipment, with its ability to multiply manual capacity, improve the quality and increase the permanence of work done, and, through economies effected, permit of a larger volume of work, may prove the deciding factor in enabling the maintenance of way and structures forces to meet the increasing demands that are being made upon them today as it did for many roads during the years of severe business depression.

Comparatively speaking, 1937 was a busy year for the maintenance forces, when, in the first four months, the railways spent $146,979,985 for maintenance of way and structures work. This compares with the expenditure of $91,371,584 for such work during the first four months of 1933, the lowest for any year of the depression. By contrast, the expenditures for maintenance of way and structures during the first four months of 1941 were $159,512,524, exceeding the expenditures for the same period in 1937 by more than $12,500,000, and being larger for this four-month period than in any other year since 1931. With this start in a year of almost certain enlarging activities, in the light of our huge national defense and aid-to-Britain programs, and especially the proclamation of the President of the United States on May 27, establishing a state of unlimited national emergency, which will unquestionably call for production exceeding that of any previous period in the history of the United States, the year 1941 will call for greater maintenance of way and structures activities than any year since 1931, and may even exceed those of that year.



In the face of these facts, and the certain further deflections from the ranks of men experienced in maintenance of way and structures work, the railways are infinitely better prepared to carry out the work which confronts them today than they would have been if they had neglected to utilize mechanical aids in less strenuous periods. Without this work equipment, it is certain that serious difficulties would lie ahead.

While the fact that the railways have so largely mechanized their maintenance operations during recent years cannot be attributed to foresight as to the situation that is now developing, failure to anticipate the increased demands in the months, and possibly years, that are immediately ahead, through the still further mechanization of their maintenance operations, would display a distinct lack of foresight. The fact that maintenance men had begun to sense the present situation as early as November and December of last year is indicated by their estimates at that time that their purchases of work equipment in 1941 would be substantially larger than in 1940, in which year such purchases reached an all-time peak of $7,250,000. However, whether their seven or more months-old estimates of needed additional work equipment are now adequate, in the light of the greater than anticipated maintenance demands that are now arising, deserves prompt and careful review.

Car Shortage

Maintenance Forces Can Help Avert One

HISTORY is repeating itself, and again, after nearly a quarter century, and due largely to the same causes, the railways of the United States are confronted with a problem that may become serious. The government is concerned—shippers are concerned—and the railways themselves are concerned. This problem is not directly related to tracks, bridges, buildings or water service facilities—it is the need for cars—and more cars.

At first thought, it would appear that this problem is essentially the responsibility of railway management and of shippers and consignees—of railway management in providing for the purchase of new cars, for adequate programs of car repair to speed unserviceable cars back into service, and in arranging for the most judicious routing and handling of cars in the different territories to meet changing demands—and of shippers and consignees in loading cars promptly at points of origin and in releasing them promptly at destination. This is true; it is the primary responsibility of management, and of shippers and consignees, whether they be government authorities, private industry or private individuals—but beyond that, and to an extent possibly overlooked by some of those involved, it is also a responsibility of every railway employee who has anything to do with the utilization of railway cars in company work, and in this respect, it is very definitely the responsibility of those in the construction and maintenance of way and structures departments of the railways who, under even normal conditions, use many cars daily in their work, a large part of which would otherwise be available for revenue service.

It is readily recognized that adequate maintenance of the physical properties of the railways and the expansion

of these facilities are essential in the face of present growing traffic demands; that this maintenance and construction work involves large quantities of new materials; and that the delivery of these materials on the job requires the use of cars—but, in view of the problem facing the railways, calling for the maximum availability and utilization of all of the cars at their command for revenue service, it is the responsibility of the construction and maintenance forces not only to keep their needs for cars to a minimum, but also to see that no cars are held in company service longer than is absolutely essential.

During most of 1917, the year in which the United States entered the first World War, there was a serious car shortage in the country, due largely to conditions beyond the control of the railways. Largely as a result, the government took over the control and operation of the railways in January, 1918. What happened as a result of this action on the part of the government "to increase the efficiency of the railways," is history, but that the efficiency of railway operation in handling the war traffic of 1918 did not increase is borne out clearly by the record, and that the railways were returned to private management on March 1, 1920, in a seriously undermaintained condition, is a fact that was fully recognized by the government itself in its subsequent payment of the large claims made by the railways to rehabilitate their lines. In the light of this experience, those who know the facts and have the best interests of the railways and the country at heart, do not want a repetition of government control and operation of the railways. Evidence of this is seen in the remarks of Louis Johnson, on April 26, 1940, when assistant secretary of war in charge of preparedness activities, who said, "You railroad men have created and perfected an organization that meets the demands of war under private individual management. There is no place in our plan either for government operation or for government ownership. Government operation is especially distasteful to us."

In spite of the lessons of the last war-time period, there are those in positions of authority in this country who favor government control and operation of the railways under almost any conditions, and who hope for developments in the present situation that will bring this about. Speaking recently, Joseph B. Eastman, chairman of the Interstate Commerce Commission, expressed the opinion that the country's transportation system can carry the burdens which will be placed upon it, but he pointed out that there are "dangers in the situation," and said that while he saw no indication at present that any plans are afoot to have the government take over the railroads, he ation or for government ownership."
or averting dangerous conditions."

With every means at their disposal, working together and in cooperation with governmental authorities and private industry, the railways are making a determined effort to avoid these "dangerous conditions" referred to by Mr. Eastman, and especially, the imminent threat of insufficient cars, with the excuse that this would give some to urge that the government take over the railways with the vain hope that it could do better.

It is true that the railways today have fewer cars and locomotives than in 1917 and 1918, but it is also true that, through increased efficiency of operation, they are able to render far more and better transportation service today than in those earlier years. It was with a knowledge of these facts that John J. Pelley, president of the Association of American Railroads said early this year, as was pointed out in our February issue, that "The railroads are ready to do whatever they may be called on to do. The railroads will keep themselves ready, ahead of any demand which may come." As faithfully as that statement represented the attitude and determination of the railways earlier this year, it represents their attitude and determination today, but even in the few months that have intervened, the problems of the railways have increased tremendously, making it necessary for them to take many steps, particularly with regard to their car situation, which it was little thought would be required during the present year at least. One of these is the purchase of large numbers of additional cars.

In the 12 months ended May 31, 1941, the railways placed orders for about 118,363 new freight cars—an increase of more than 61,000 over orders in the 12 months ending May 31, 1940, and larger than the orders in any calendar year since 1929. On April 1, 1940, they had on line 1,827,000 cars (including private-line cars). That they felt the need for still more cars is seen in the fact that they ordered 16,091 cars in April and 19,221 more in May. Looking further into the future, in the face of revised estimates that freight loadings will reach 44,000,000 cars in 1942 and 48,000,000 in 1943, representatives of the railways met on May 12 and approved a program looking to an increase in freight car ownership by 120,000 cars in 1942, and by 150,000 additional cars in 1943.

From the foregoing it is evident that one of the most important, if not the most important, problem of the railways at the present time, and which will recur at intervals so long as carloadings continue to increase under the stimulus of the country's huge national defense program, aid to Britain and stimulated industry generally, is the need for more cars and for the more intensive utilization of cars. That this problem goes far beyond railway management and reaches down into the ranks of the construction and maintenance of way and structures departments in so far as they use cars in their work operations, was emphasized recently by Fred G. Gurley, vice-president of the Santa Fe, in an address before the Maintenance of Way Club of Chicago, in which he made an urgent appeal to those present to aid management in its need for cars for revenue service by so conducting their work that the cars required for construction and maintenance operation would be out of revenue service a minimum length of time.

The steps necessary on the part of these forces to this end are evident to every construction and maintenance employee. Essentially, they include working in close cooperation with the purchasing and stores department; careful estimates of material requirements to avoid subsequent extra movements; care to see that materials are ordered and delivered in the order in which they are to be used; accurate estimates of the dates when materials are needed; and the careful programming of work and force organizations to the end that all cars received can be released for revenue service with the greatest dispatch.

That this new demand brings new obligations and responsibilities upon construction and maintenance men at a time when increasing construction and maintenance activity are already taxing their energy and resources, is unfortunate but, knowing of the seriousness of the car problem, and of the possible consequences if the problem is not solved successfully, it can be assumed with certainty that they will co-operate to the fullest extent.

Great Northern With Modern

Above—Crawler-Mounted Draglines Were Employed Extensively for Widening the Higher Fills. Right—Elevating Graders, Pulled by Powerful Tractors, Were Used for Widening Many of the Small Fills

During the last four years, the Great Northern has engaged in a progressive program of bank widening and ditching in which modern methods with off-track equipment were used on an increasingly extensive scale

FOR many years the Great Northern, like most other railroads, has done a limited amount of bank widening work, using elevating graders in some cases, and in other cases using draglines and work train equipment. In recent years, however, more extensive programs of bank widening and ditching, which amount to complete roadbed rehabilitation, have been prosecuted on an increasing scale, with as much as 47 miles being completed in 1939 and 111 miles in 1940. Off-track equipment has been used entirely and the work has been done in advance of, or in conjunction with, other improvement work such as rail relaying and re-ballasting operations. In addition, numerous passing track extensions and some curve reduction work have been accomplished along with the ditching and bank widening work.

The purpose of this ditching and bank widening work has been not only to provide wider and more stable enbankment conditions, but also to improve drainage conditions greatly, with resultant lower maintenance expenditures. All drainage has been moved as far from the track as possible. Cuts have been widened. Old borrow pits have been filled to provide proper drainage and the entire right of way has been left with a smooth and finished appearance, with flat slopes to reduce future erosion. The emphasis on drainage, in addition to improving track conditions during the working season, has had a pronounced effect on heaving during the winter months, and the widening of cuts has been very beneficial in eliminating the accumulation of snow.

In scheduling this work, the Great Northern has endeavored to do the ditching and bank widening work a year ahead of the rail renewal and re-ballasting operations, although, in some cases, the work has been done during the same year.

Off-Track Equipment Used

The exclusive use of off-track equipment has permitted this work to be done without interference with traffic and without train delays. The types of equipment used on each job have varied, depending on the type of terrain, the yardage, the amount of haul necessary, the availability of suitable borrow and other local conditions. Such equipment included crawler-mounted shovels and draglines, dump trucks, 12-cu. yd. pneumatic-tired LeTourneau carryalls, crawler tractors equipped with bulldozers and angle dozers, large elevating graders and various miscellaneous equipment, including blades of several types. Nearly all of the heavier units of equipment, including tractors, were Diesel-powered.

In North Dakota, where conditions are generally favorable, a great deal of bank widening work has been done with large elevating graders pulled by crawler tractors. This work was finished with blades of various types, also pulled by tractors. On long high fills, several methods have been employed. One method used frequently has been to haul the dirt from cuts or borrow pits with 12-yd. LeTourneau carryalls or with trucks, forming a berm along one side of the fill, and then use a dragline operating on the berm to cast the material on both sides of the fill. The large carryalls are particularly adaptable and economical at locations where considerable yardage is involved.

In some cases where side borrow was obtainable, draglines were operated directly between the borrow pit and the track, casting the dirt on the side of the embankment; in other

Widens Banks

Off-Track Equipment

cases, where side borrow was not available and the fills were not too high, the dirt was dumped on both sides of the fill by carryalls or trucks, and bulldozers, angle dozers and blades were used to place the dirt on the side of the embankment and to finish the slopes. In large cuts, ¾-cu. yd. to 1½-cu. yd. crawler-mounted shovels or carryalls were used and the material was hauled to the nearest fill.

Bank Widening Standards

Main line embankments are widened to a standard crown of 22 ft., and on high fills to 24 ft. The old standard for main lines varied from 16 to 20 ft., but in many cases, due to erosion by rain and wind, the latter particularly in North Dakota, the effective crown before bank widening was much less. On some secondary lines, embankments were widened to an 18 or 20-ft. crown, depending upon the traffic conditions. The side slopes are not steeper than 1½ to 1, and in territories where soil conditions are poor and suitable material is available for bank widening, the side slopes are specified to be not steeper than 3 to 1, and a crown of 24 ft. is required.

The side slopes of the old embankment are plowed or scarified to permit a solid bond between the old and the new embankments, before placing the bank-widening material. Where necessary, the side slopes are dragged after placing the bank-widening material to break down any large chunks of earth and leave the slopes in a uniform condition. No boulders or large rocks are allowed to be placed in the embankment slopes and those found in the right of way must be buried before the borrow pits and back slopes are finished. When side borrow is placed directly by a dragline, a berm not less than 12 ft. wide is left between the toe of the slope of the new embankment and the edge of the borrow pit.

The bank widening is usually finished to a height of 15 in. below the top of the tie, and great care is exercised in placing the bank widening material at the top of the subgrade so as not to cover or destroy the ballast shoulder. In some cases, before starting the bank widening work, a discer, adjusted to throw the ballast up on the ends of the ties, is operated over the track. A small tractor or similar equipment is used on the new shoulder in finishing operations to compact it.

When the bank widening is completed, the new shoulder and embankment slopes are sown with Rye grass and Brome grass, the area sown extending about six feet down the slope from the shoulder. The Rye grass acts as a mother grass and Brome grass establishes a sod. About 2½ bu. of Rye grass and about 35 lb. of Brome grass are sown per acre of seeded slope.

In widening cuts, the ditch must be placed as far from the track as practicable, with a uniform flat slope extending from the embankment shoulder of the track to the ditch, and varying between limits of from 6 to 10 to 1. Where excess material is excavated in widening cuts and ditches, the material must be used in widening the roadbed or to fill in low spots on the right of way. Additional right of way is purchased when required, also borrow rights for borrow off the right of way. Borrow pits on the right of way are bladed or otherwise smoothed, leaving a neat appearance, without depressions, and sloped gently to cause

A 1½-cu. yd. Diesel Shovel Loading a Truck on the Line Between Nickerson, Minn., and Brook Park. Note the Flat Slope Away From the Track

Right—One of the Large Tractors and Carry-Alls Used for Heavy Borrow Work in North Dakota. Below — A Large Tractor, Equipped With a Bulldozer, Working on a Curve Reduction Project

A Large Tractor Equipped With an Angle-Dozer Forming a Berm Along the Embankment with Dirt Dumped from Trucks

drainage to flow away from the roadbed. No borrow is made on the railroad right of way below the level of the nearest water outlet. All back slopes in widened cuts and borrow pits must be smoothed.

Other Work

In the lengthening of culverts and pipe the riprap at the ends is removed and replaced, care being taken so there will be no obstruction to the free flow of water through them when the work is completed. Highway and private crossing approaches are also built up and improved as to view during the bank widening and ditching operations.

Train lineups are furnished, in order that operations may be in the clear when trains are due. Flagmen are used whenever any operations are performed which interfere with proper clearance, with the exception of the operation of the dragline when casting material. In this case a watchman is provided to warn the dragline operator, and the trains are given an order to watch out for the dragline operations. No material is hauled over the track.

Enginering Supervision

All work is done under the direct supervision of an engineer in charge. The engineers take sections before the bank widening work is started in order to prepare estimates of the amount of yardage and again after the completion of the work for roadway completion reports and for capitalization. On most of the bank widening work, the amount of yardage moved to restore the old original section has averaged approximately 25 per cent of the total. The remaining 75 per cent has been required for additional bank widening and was charged to additions and betterments or capital account.

Bank Widening in North Dakota

A better understanding of the work done may be gained by a description of several projects completed in 1940, which represent different methods and equipment. During that year three projects were carried out in North Dakota for main line ditching and bank widening work involving very different problems. Two of the jobs were in the typical flat rolling North Dakota prairie country, and the other was in territory with poor soil conditions, high fills and many curves. The latter job, which was located between Avoca, N. D., and Williston on the ruling grade leading from the Dakota prairies down into the Missouri River valley, averaged about 8,000 cu. yd. per mile. The other main line jobs varied from approximately 2,850 to 5,850 cu. yd. per mile.

There were used on this work four large D-8 Caterpillar tractors, equipped with straight bulldozers, two 13-cu. yd. pneumatic-tired LeTourneau carryalls (each operated by a Caterpillar D-8), two 48-in. elevating graders, a 20-B Bucyrus-Erie ¾-cu. yd. convertible shovel-dragline, a No. 12 motor patrol vernier blade, a No. 125 Adams blade with a 12-ft. blade and a 3-ft. extension, and a terracer blade. A few dump trucks were also used occasionally.

The elevating graders were used extensively on the light work. The carryalls were used for work on the higher fills, particularly where side borrow was limited because of drainage conditions. The dragline was used to cast the bank-widening material on the high fills. The tractors were used as straight bulldozers and to pull the elevating graders, the carryalls and the blades. The Motor Patrol vernier blade was used to finish borrow pits and back slopes. The Adams blade was used to finish the side slopes on the fills and the small terracer blade was used to finish the top of the shoulder near the track.

The work near Williston, which required stable slopes because of soil conditions, was further complicated by the fact that the line at this point follows the course of a rapid stream in which several extensive channel changes had been made. The railroad embankment in some locations was protected by a berm and in others by riprap. The berm and channel changes were not disturbed, and all riprap was removed and replaced. All work was done in the clear, so as not to interfere with train movements, and no flagmen were required, except occasionally for moving heavy equipment from one side of the track to the other.

Bank widening work has also been done on secondary lines in North Dakota. The yardage on this work has varied considerably, averaging from approximately 4,500 to 7,000 cu. yd. per mile. Although this yardage is relatively as heavy as much of the main line work, the character of the work is somewhat different. On a large proportion of this work the grading required is light, and has been done entirely with large blades pulled by powerful tractors, which reshaped the ditches and back slopes quickly and economically. The remainder of the yardage was usually concentrated on a few high fills and was handled by the methods previously described.

In 1940 the Great Northern did a large amount of ditching and bank widening work on the line between Minneapolis, Minn., and Duluth, ap-

A Truck Dumping Dirt for a Berm Alongside a Fill Over a Muskeg Swamp near Duluth, Minn.

proximately 41 miles between Nickerson, Minn., and Brook Park being completed in that year. The improvement program on this line, in addition to bank widening and ditching work, calls for the track to be relaid with 112-lb. rail and reballasted, sags in the grade line to be raised and various passing tracks were extended to make them approximately 7,000 ft. in length.

A Widened Cut Before Final Dressing Had Been Completed. Note the Gentle Slope from the Track to the Ditches, Which Are Placed as Far Out as Possible

Bank Widening Near Duluth

The grading on this line was totally different in character from that in North Dakota. No direct side borrow was possible since nearly all the fills extended over muskeg swamps. All of the material, with the exception of that in the territory between Hinckley, Minn., and Brook Park, was hauled from widened cuts or occasionally from outside borrow pits. Between Hinckley and Brook Park the embankment of an old abandoned second track was used for bank widening by casting over with a dragline.

The yardage averaged approximately 7,000 cu. yd. per mile. Three shovels were used, a 1½-cu. yd. Bucyrus-Erie 37-B, a 1-cu. yd. Koerhing and a ¾-cu. yd. Koerhing; two draglines, a 1½-cu. yd. Bucyrus-Erie 37-B and a ¾-cu. yd. Koehring; five International and Caterpillar crawler-tractors equipped with angle dozers; ten 3½-ton International dump trucks, and a Fordson tractor with a directly-coupled blade.

Method of Operation

The shovels were used in the cuts, loading into trucks which hauled the material to the fills, dumping it in a berm along one side of the fill. The angle dozers smoothed out the berm and the draglines operated on the berm, casting the material up on both sides of the fill. The tractor and blade smoothed the shoulders. A tractor, dragging a 12-in. by 12-in. timber attached by chains, was used to smooth the side slopes. Tractors equipped with angle dozers were also used for grubbing ahead of the bank-widening operations.

Two shifts were required on the draglines and the other equipment was worked one shift daily. This was necessary in order to enable the draglines to keep up with the work. In most cases the cuts were widened as much as possible to secure enough material for bank widening and to improve snow conditions. When the cuts were widened in this manner, a gentle slope was provided from the track to the ditch, which was placed as far away from the track as possible. The bank widening was finished about 3 in. high to allow for settlement, although the finishing equipment packed it somewhat. On this work the finished embankments had nearly a 2 to 1 slope.

Drainage Structures

In addition to the grading work, a new 6-ft. by 6-ft. reinforced concrete box was built in place of an old trestle, which was filled. One 8-ft. by 8-ft. stone masonry box was extended and one 6-ft. by 6-ft. concrete box, located on a curve change, was extended 18 ft. on one end.

All equipment was required to operate in the clear (8 ft. from the center line of the track) and if necessary, flagmen were used. A gang of linemen set back or reset telegraph poles and anchors. This was necessary on this job because the cuts had to be widened extensively to secure material. On other jobs linemen were usually furnished to reset the anchors only, it being possible to do the work without disturbing the telegraph line, and still leave a substantial berm around each telegraph pole. One of the principal difficulties with the use of the bigger units of off-track equipment, such as draglines and shovels, was the difficulty of operation under and between telegraph poles and wires.

The use of large modern units of earth-moving equipment has enabled this work to be carried out at very reasonable costs and without interference to train movements. The benefits are many, including a more substantial roadbed for the heavier ballast section needed to withstand heavy traffic at higher speeds; better drainage, with reduced maintenance expenditures; less heaving in winter; and better snow conditions in the widened cuts. The smooth slopes of the finished right of way will also aid mowing operations in the future. This is highly advantageous in some territories where adjacent farmers are glad to mow right of way for the hay.

Operating Conditions Improved

Operating conditions have also been improved because of the wider and improved view along the track. In addition, grade crossings, where the view was poor, have been improved by additional "daylighting" in connection with the regular grading operations. Lastly, ditching work and the reshaping of ditches in the future can be done with off-track equipment, such as small carryalls, blades or crawler tractors equipped with angle dozers, without interference with train operations.

The program on the lines east of Williston has been under the direct supervision of E. E. Adams, district engineer and R. S. Kniffen, general roadmaster, at Duluth, Minn. A similar program on the lines west of Williston has been carried out under the supervision of H. J. Seyton, assistant chief engineer, and G. G. Smart, general roadmaster, both with headquarters at Seattle.

A Completed Curve Reduction Before Rail Relay and Final Surface. Note the Wide Banks and Gentle Slope to the Ditch

The Simple Lines of the Station Give It a Pleasing Modern Appearance

Builds

Chicago, Rock Island & Pacific constructs a modern streamlined suburban passenger station at materially reduced cost by using salvaged brick for the exterior walls. The new station is of simple, yet substantial, design in the interest of maximum utility and minimum maintenance

IN replacing an unsightly old frame suburban station on its main line at 99th street, Chicago, with a new structure employing salvaged second-hand common brick in conjunction with a modern motif and plan, the Chicago, Rock Island & Pacific recently demonstrated what can be done when there is a determination to keep costs to a minimum, without sacrificing appearance. The new station, a one-story structure, is not pretentious in size or treatment, but meets adequately the needs of the commuter area served and, like the old station provides living quarters for the agent, a widow, who has been located at this point for a number of years.

When bids were first requested for the proposed station, those received, ranging around $11,500, were considered too high, and they were rejected. It was felt that the new station should be built for approximately the cost of constructing a new brick bungalow in the same area, since the two would be comparable in size, with much of the interior work of a similar nature.

About the same time that the original bids were rejected, a contract was awarded by the road for the removal of a wall surrounding a large grain elevator in South Chicago. This wall was built of common brick, which was being hauled away to dumps. In the light of this situation, it was decided to ask for new bids for the station on the basis that the railroad would furnish all concrete materials and brick salvaged from the elevator. As a result, a contract was awarded on this basis for approximately half the former figure.

Functional Design

The exterior of the station built employs the second-hand common brick throughout, with the exception of a small amount of new red face brick used for trim. The building is rectangular in plan, 65 ft. 6 in. long by 20 ft. wide, with simple lines and a flat roof which projects out as a canopy a distance of 7 ft. on the track side. A wide facia board on this roof extension, with rounded corners, gives the small station a trim, streamlined appearance.

To accommodate the modern requirements of suburban passengers, who usually arrive only a few minutes before train time, the station was planned essentially with a small waiting room, an open shelter at each end, and a parking area. The remainder of the station building provides living quarters for the agent. One large window in the center of the building, facing the tracks, is flanked by two normal size windows, one on each side. The new station is located on the same side of the tracks as the old station, 16 ft. back from the center line of the nearest track, but a little further north of 99th street than the old station to provide a parking area for 10 to 12 automobiles, which can be enlarged, when needed, by utilizing a similar area north of the station.

The plans for the station called for a concrete foundation, with a basement under the living quarters; concrete floors, except in the agent's living quarters, where the floors are of wood; common brick walls; steel casement windows; and a flat board roof covered with four-ply tar and felt built-up roofing with a gravel top coat. The interior partitions are of frame construction and, with the exterior walls, support the roof. The brick walls are 9 in. thick, except at the corners, where they are offset for appearance to a thickness of 1 ft. 1 in. The roof deck is supported by 2-in. by 10-in. roof rafters, spaced 16 in. apart, which rest on 3-in. by 8-in. metal bearing plates, bolted to the brick masonry. Steel I-beams of 25.4-lb. section, incased in the brickwork, are provided above all door, window and shelter openings. The eaves of the roof project 2 ft. beyond the building face at the back, 3 ft. on the ends, and 7 ft. on the front, or track side. Scored flexboard was used to box in the under side of the eaves. The roof slopes slightly to the rear, where a metal gutter and downspouts take care of roof drainage.

The shelters provided at the ends of the station, which are open on three sides, are each 20 ft. long, the full width of the building, and 12 ft. wide. They have concrete floors 5 in. thick, and brick posts at their outside corners, which support the roof. Concrete steps adjacent to the building at the rear of each shelter provide access from a driveway in back of the station. The only enclosure of the shelters consists of 1½-in. pipe railings along the rear and ends, the front side, in each case, being open to the track platform.

Exterior Finish

From the large amount of second-hand common brick available from the elevator wall being demolished in South Chicago, it was possible to se-

Attractive Station of Second-Hand Common Brick

lect only those which could be cleaned quickly and economically. The bricks selected were of many shades, most of them being light red and light brown, although a few were almost black. Laid up at random and subsequently wire brushed, they furnished in the completed walls, an attractive variety of tones, which, from a distance, blend into a pleasing light tan. The only new bricks used were a few red face bricks employed for trim beneath the window sills at the front and south end of the station. Harmonizing with this brick, the outside of the window sash and casements, doors and door trim, and the facia board of the roof, were painted a chinese red. The pipe railing enclosures of the shelters were painted with aluminum paint.

The Waiting Room

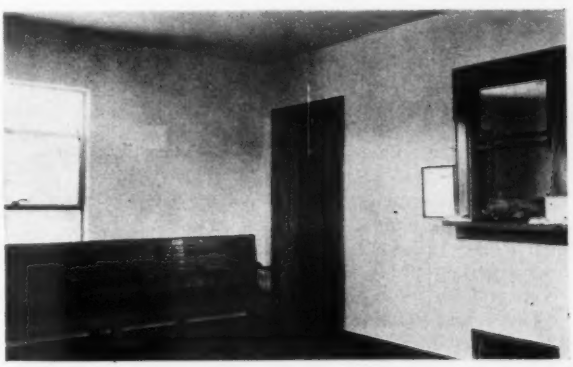
The enclosed portion of the station can be considered as two distinct parts, one part consisting of the waiting room, with a public toilet, and the other, the agent's living quarters and ticket office. The waiting room is located at the south end of the station, nearest 99th street, and is 14 ft. wide and 20 ft. long. The public toilet room is 3 ft. by 6 ft. in area and is located immediately off from the waiting room, toward the rear. A small window, fitted with frosted panes, provides light for this room.

The waiting room is entered from the outside through a doorway at the south end of the building near the track side. Directly opposite this doorway is another in the partition between the waiting room and agent's living quarters, which provides access between these areas. The waiting room has three windows, one at each end, facing out at the front and rear of the station, and one on the side, or south end of the station, near the back. The latter window, facing the shelter, provides a view of the tracks to the south from which direction trains to the city approach the station. The ticket window is located in the partition between the waiting room and the agent's living quarters, and built-in cupboards of yellow pine are located below it in the agent's living room.

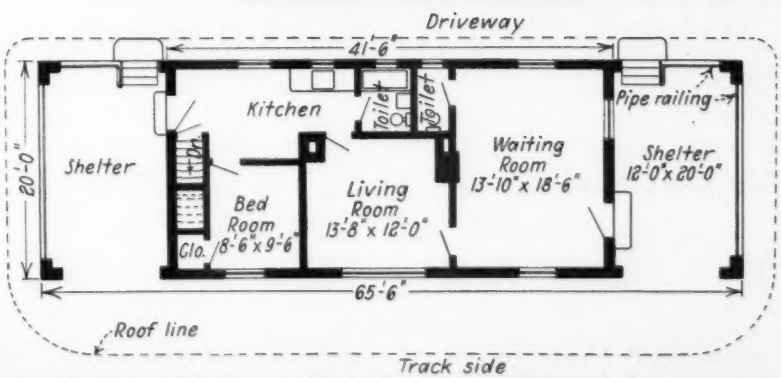
The walls and ceilings of the waiting room and public toilet are finished with plaster, applied over waterproofing directly to the brick in the case of exterior walls, and to gypsum lath on the partitions and ceilings. The walls and ceilings of these rooms are painted a light green. The concrete floor of the waiting room is finished with a dark red surfacing material and is waxed. Ponderosa pine is used for all interior trim and doors. The woodwork has a natural clear varnish finish and the interior face of the steel sash is painted dark brown. The waiting room is furnished with four depot-type oak settees, which are sanded, revarnished and placed along the walls. On the outside of the station, there are four park-type benches, painted green, two in front of the station and one in each shelter.

Agent's Living Quarters

The station agent's living quarters occupy an area 26 ft. 4 in. by 20 ft., except for the space occupied by the small public toilet room, which is recessed from the waiting room into one corner of this area. These quarters include a living room, a bedroom, a kitchen and a bathroom. The living room and bedroom occupy the front side of the area, with windows overlooking the tracks, and are 13 ft. 8 in. by 12 ft., and 8 ft. 6 in. by 9 ft. 6 in. in area, respectively. The bathroom, 4 ft. 9 in. by 6 ft., is located to the rear of the station, be-



Right—One Corner of the Waiting Room Showing Part of the Window Facing the Track, the Doorway to the Living Quarters and the Ticket Window



Floor Plan of the Station, Showing the Location of the Waiting Room and Agent's Quarters

A Part View of the Kitchen and Bathroom in the Station Agent's Quarters

hind the living room and adjoining the public toilet. The remainder of the space in the agent's quarters is occupied by the kitchen, a bedroom closet and a stairway to the basement. Doorways open from the kitchen into the living room, bedroom and bathroom, and to the basement stairway. A back door opens from the kitchen to the rear of the north shelter.

The walls and ceilings of the living quarters, except in the kitchen and bathroom, are finished with plaster. In the kitchen and bathroom the ceilings are plastered, while the walls are finshed with flexboard, scored into 4-in. squares to form a wainscot to a height of 4 ft. above the floor, and plain above this level. Stainless steel molding is used in these rooms for trim. The woodwork and interior face of the steel sash in all of the rooms of the living quarters are painted with white enamel. Built-in cupboards are provided in the kitchen, and venetian blinds shade the living room and bedroom windows.

The floors of the living quarters are covered with a heavy grade of figured linoleum, light tan in color. The roof over the rooms of the station proper is insulated with rock wool placed between the rafters. In addition, to eliminate sound, the walls between the living quarters and the public toilet are also insulated.

Heating and Lighting

For night illumination, a large fluorescent light with three-20-watt tubes is located in the center of the ceiling of the waiting room, and a small fluorescent light is provided in the public toilet room. Two column lights and four canopy lights illuminate the shelters, platform, parking area and the track side of the station itself. One tube of the fluorescent light in the waiting room, the light in the public toilet, and all of the outside lights except one canopy light just above the agent's bedroom window, are controlled by an electric time clock which turns them on automatically at dark and off automatically at daylight. Modern lighting fixtures and numerous wall plugs are provided in the living quarters of the station.

Heating of the station is by means of a welded-type, hot-air coal furnace, with a rated capacity of 110,000 B.T.U., which is located in the basement and connected to the various rooms by means of hot and cold air ducts. An automatic gas heater, also in the basement, furnishes hot water.

The station was constructed by McGrath & Tocatlian, Chicago, general contractors. The design and construction were under the general direction of W. H. Hillis, assistant chief operating officer of the Rock Island, and F. W. Thompson, engineer officer, and under the immediate supervision of David A. Ruhl, engineer of buildings. The total cost of the building, including materials furnished by the railroad, grading, etc., was approximately $7,500.

Rail Production Makes Further Gain in 1940

REFLECTING not only the improvement in economic conditions that was so evident during the year, but also the determination of the railways to put their properties in the best physical condition for increased business, the production of rails in the United States during 1940, according to statistics compiled by the American Iron and Steel Institute, aggregated 1,678,986 net tons. This was 366,339 tons, or 28 per cent more than the 1,312,647 tons rolled in 1939 and was greater than for any year since 1930. Incidentally, this production was also 1,228,112 tons, or 3.7 times, larger than that of 1932, the year of lowest production during the present century.

As has been the case for several years, the tonnage of the heavier sections predominated, the rollings for sections weighing 100 lb. and heavier amounting, in 1940, to approximately three-fourths of the total production for the year. This indicates that the trend toward the use of heavier rails, which began when the A.R.E.A. adopted its 112 and 131-lb. sections, is continuing. The total amount of rail weighing 100 lb. and heavier produced in 1940 was 1,198,871 tons, compared with 1,136,042 tons in 1939, an increase of 62,829 tons.

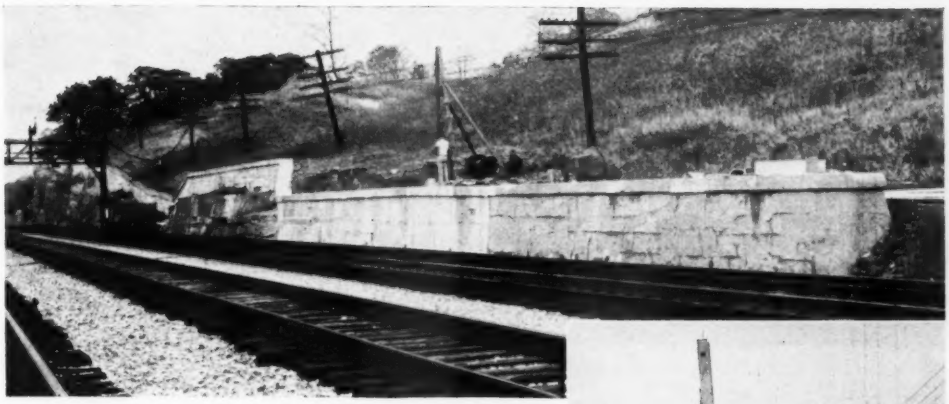
The production of rail weighing 100 lb., but less than 120 lb., was 688,109 tons, compared with 620,992 tons in 1939, an increase of 67,117 tons, or 11 per cent. Except for 1937, this is the largest production for these sections since 1930. In the next group, which comprises sections from 120 lb. to, but less than 136 lb., the rollings in 1940 amounted to 486,716 tons compared with 480,675 tons in 1939, an increase of 6,041 tons. While this may seem to be a small increase, the tonnage represented by this group is greater, with the exception of 1939, than the total tonnage of all sections 120 lb. and heavier, for any year since 1931. Only in the case of sections

(Continued on page 485)

Production of Rails by Weight Per Yard in 1940 (Net Tons)

Year	Under 50 lb.	50 and less than 85 lb.	85 and less than 100 lb.	100 and less than 120 lb.	120 and less than 136 lb.	136 lb. and over	Total
1920	547,728	485,333	1,066,937	.....	816,612	.....	2,916,610
1925	183,240	246,006	857,215	.....	1,833,027	.....	3,119,488
1926	220,931	287,041	893,382	.....	2,202,413	.....	3,603,767
1927	181,256	194,048	604,178	1,472,155	691,627		3,143,264
1928	150,301	140,813	521,240	1,348,199	804,639		2,965,192
1929	158,326	115,297	458,783	1,381,631	934,758		3,048,795
1930	107,101	91,055	300,024	935,756	664,085		2,098,021
1931	56,100	28,587	138,206	555,242	518,546		1,296,681
1932	18,654	15,350	32,024	240,902	143,944		450,874
1933	*55,010	†17,263	45,890	172,488	175,601		466,252
1934	*78,495	†19,164	82,476	550,639	365,055	35,622	1,131,451
1935	*63,982	†16,529	95,902	381,696	172,891	65,921	796,921
1936	*107,644	†23,629	111,956	684,910	412,687	25,402	1,366,228
1937	*113,889	†92,219	126,155	815,280	436,698	34,987	1,619,228
1938	*50,375	†27,627	57,550	371,534	188,034	2,522	697,642
1939	*92,994	†20,013	63,598	620,992	480,675	34,375	1,312,647
1940	*140,443	†114,666	225,006	688,109	486,716	24,046	1,678,986

*60 lb. or less per yd.
†Over 60 and less than 85 lb. per yd.



General View of the Retaining Wall at Rhinecliff, N.Y., and of the Core Drilling Operations

Failed Retaining Wall Reinforced With Old Rails

Describes methods used on the New York Central to restore a concrete retaining wall to a satisfactory degree of strength by reinforcing with old steel rails anchored to underlying rock, and grouting it internally

BY grouting it internally and by inserting second-hand rails in a vertical position to act as dowells and as reinforcing, the New York Central has restored to a satisfactory degree of strength a concrete retaining wall that had shown evidences of failure. Not only have the rails had the effect of reinforcing the wall against horizontal shear (the primary cause of failure) but they extend through the foundation into the rock beneath the wall, thus effectively keying it in position.

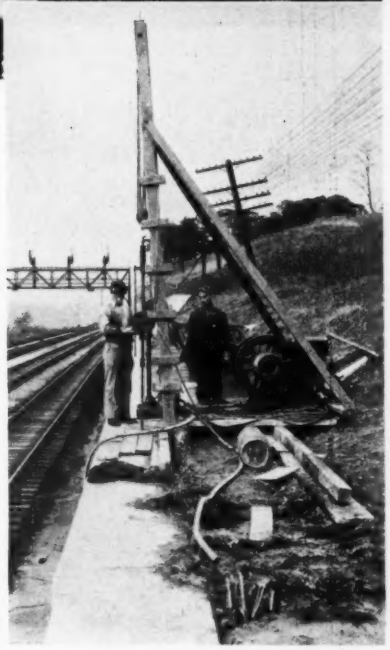
Location of Wall

The retaining wall in question is located three miles south of Rhinecliff, N. Y., on the Central's four-track main line between New York and Albany. It is situated on the uphill side of a side-hill cut and for much of its length it is located on top of a rock ledge that forms the slope of the cut. At the southerly end of the cut the rock outcropping disappears and here the retaining wall drops down to the level of the roadbed, the southerly 225 ft. of the wall being located at this elevation. Between the latter section of the wall and that located on top of the rock slope, there is a connecting length of wall, about 35 ft. long, which is on an incline.

The section of the wall at the lower level extends about 9 ft. above the ditch line and has a width of 2 ft. at the top. Behind this portion of the wall the slope, which consists of a mixture of yellow clay and loam, rises to a height of 50 ft. at a point about 100 ft. from the wall. During heavy rains the slope material becomes highly unstable and has a tendency to slide, the loose material breaking away along a cleavage plane located near the top of the slope.

As a result of the extra load imposed on the wall due to the sliding of the slope, a rupture in a horizontal plane occurred at the northerly end of the 225-ft. section. This rupture was about 35 ft. long and was located for the most part about midway of the height of the wall. That portion of the wall above the break had shifted outward slightly so that it overhangs the lower portion for distances varying up to about 4 in. In addition to the break, a certain amount of deterioration had occurred in the concrete, particularly in the vicinity of the rupture, which was manifested largely by surface cracks. To restore the integrity of the wall and to reinforce it against further movement, it was decided to apply the corrective measures mentioned at the outset to a section of the wall about 120 ft. in length in the vicinity of the break.

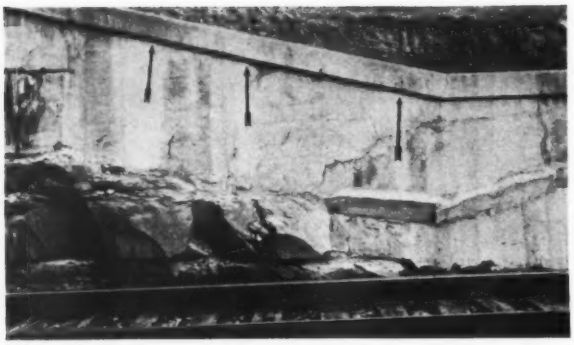
The procedure employed in drilling the holes for the rails is one that is used extensively on the New York Central in the grouting of stone masonry piers and abutments. In this procedure holes are drilled down through the masonry structure with a 6-in. shot core drill which is withdrawn occasionally, particularly when seams or voids are encountered, and thin cement grout is poured into the hole until the voids in the immediate vicinity have been filled. When the grout has hardened sufficiently, the drilling is continued.



The Holes For the Rails Were Drilled With This 6-In. Shot Core Drill

On the retaining wall job at Rhinecliff, the holes were drilled slightly to the rear of the center line of the top of the wall and were extended entirely through the wall from top to bottom and into the underlying material. A total of 13 such holes were drilled and, while the location of the individual holes were determined largely by the condition of the wall, the average spacing was about 9 ft. To prevent the loss of grout through the horizontal break, the crack on the face of the wall was closed by a dam of cement plaster poured in a timber form.

In each of the holes, a section of 80-lb. second-hand rail was inserted, after which the hole was completely



As Shown in This View, the Positions of the Rails Were Indicated by Arrows Painted on the Face of the Wall

filled with grout, the upper end of the rail being about 6 in. below the top of the wall. The rails were of sufficient length to extend about 8 ft. into the rock foundation and had an average length of about 17 ft. For a short distance at the southerly end of the repaired section, the surface of the rock drops away from the bottom of the wall, and here the rails were extended through the intervening material and into the rock. In order that the location of the rails may be noted without the necessity of climbing to the top of the wall, a black arrow has been stenciled on the face of the wall at the location of each rail.

The drilling rig used in boring the holes consisted of a gasoline-engine-powered drill mounted on a timber platform which embodied an A-frame carrying a hoist used in handling the tools. This rig was moved between successive set-ups by sliding it on timber skids placed on the top of the wall and on the ground behind it, and to make this possible it was necessary to excavate a portion of the slope directly behind the wall.

The work of repairing the wall at Rhinecliff was carried out under the supervision of K. L. Miner, supervisor of bridges and buildings at Beacon, N. Y., and W. E. Malott, general foreman of drillers of the Eastern Lines, at New York.

Analysis of Latest Report On M. of W. Accidents*

IN THE last decade, the railways have made great strides in promoting safety, both in operation and among their employees. While this record should be a source of pride, the fact remains that constant effort must be made not only to maintain, but to improve the record. A study of accident statistics, which show the principal causes and types of accidents, may be helpful in striving further to eliminate or reduce accidents.

Accident Bulletin 108 of the Bureau of Statistics of the Interstate Commerce Commission for the year 1939 shows that reportable accidents of all kinds on the railways in the United States resulted in 536 employees being killed and 17,383 injured in that year, a slight increase as compared to 513 killed and 16,569 injured in such accidents during the previous year. However, the number of employees killed in 1939 was less than for any year on record except 1938 and 1933.

A more accurate picture of the accident situation may be obtained from a study of the casualty rates, or the number of accidents per million man-hours worked. The casualty rate for employees on duty per million man-hours for all Class I railroads (excluding switching and terminal companies) in 1939 was the best for all time, being 0.20 killed and 6.64 injured per million man-hours, as compared to 0.21 killed and 7.17 injured per million man-hours in 1938.

Maintenance of Way Standing

As compared to other departments of the railroads, the maintenance of way and structures department of the Class I roads as a whole (excluding switching and terminal companies) ranked second in 1939, its accident rate exceeding that of all other departments except the transportation (train and engine) service. The rate for the maintenance of way and structures group was 0.22 killed and 7.30 injured per million man-hours, which is slightly higher than the over-all average rate for fatalities, 0.20, and considerably higher than the over-all average rate for non-fatal injuries, 6.64. While the nature of their work accounts to some extent for the fact that the accident records of maintenance of way and structures employees exceed those of all other groups except one, it should constitute a challenge to this department to strive for further improvement in its accident rate.

Individual railroads have made remarkable records in safety in their maintenance of way departments. This is shown in Table 5 of the bulletin, which gives the three-year average casualty rates for the years 1937, 1938 and 1939 for roads with man-hours in excess of 10,000,000. In this table the Union Pacific has the lowest casualty rate of 2.59 per million man-hours worked, the Atlantic Coast Line is next with a rate of 2.80, followed by the Chicago & North Western with a rate of 3.26 and the Great Northern with a rate of 3.68 per million man-hours. An interesting characteristic of this table is the wide variation, from a casualty rate as low as 2.59 to one as high as 28.66, and the further fact that eight roads have casualty rates above 10.00 per million man-hours. This wide variation in a three-year average should demonstrate that there is room for improvement from the standpoint of safety in the operation of the maintenance of way and structures departments on a number of roads.

Employee Group Ratings

Another compilation of interest to maintenance of way men is Table 55, in which accidents to employees of Class I railroads (excluding switching and terminal companies) are classified by employee groups, such as roadmasters, bridge and building carpenters, section men, etc. As might be expected, the largest group, section men, had the largest number of accidents in 1939, with 30 killed and 1,664 injured. However, this group had a relatively low casualty rate; 0.136 killed and 7.52 injured per million man-hours.

The table also shows the number of train, train-service and non-train accidents. In this connection, it is pertinent to note the high proportion of train-service accidents to section men that were fatal, 18 of 89 train-service

*Accident Bulletin No. 108, annual report of the Bureau of Statistics of the Interstate Commerce Commission.

accidents being fatal while 71 resulted in non-fatal injuries. The non-train accidents for this group, numbering 1,601, resulted in only 12 fatalities and 1,589 non-fatal injuries.

The next largest total of accidents occurred to extra gang men, with a total of seven killed and 532 injured on Class I roads in 1939. For this group the rate killed was 0.106 and injured 8.02, per million man-hours, a lower fatality rate and a higher injury rate than for section men. It is interesting to note that almost the same percentage of the total number of accidents were train-service accidents in the case of the extra gang men, namely, 5.0 per cent, as with section men, 5.2 per cent. In the train-service accidents among the extra gang men, however, the proportion of fatalities was lower, there being a total of 27 train-service accidents, of which only 5 were fatal.

From the standpoint of total accidents, the next largest group was the bridge and building carpenters, with a total of 15 fatalities and 374 injuries. The casualty rates for these employees was high, amounting to 0.614 fatalities and 15.32 injuries per million man-hours. In this group, nearly all the accidents were non-train accidents. Two other groups deserve mention because of their high casualty rates. The gang foremen for unskilled bridge and building and signal and telegraph laborers had the highest rates, with 3.670 fatalities and 38.53 injuries per million man-hours; the group which had the next highest casualty rates was the bridge and building iron workers, with 1.265 fatalities and 16.45 injuries per million man-hours. It is interesting to note that the casualty rates among foremen of skilled bridge and building labor and of skilled signal and telegraph labor were far lower than the combined rate for foremen of unskilled bridge and building and signal and telegraph laborers, which would probably hold true also for various classes of skilled and unskilled labor, although no direct comparisons of this sort are given.

Train Accidents

Train accidents caused by defects in or improper maintenance of way and structures totaled 709 in 1939, as compared to 720 in 1938; 1,065 in 1937; 656 in 1933 and 2,095 in 1929. Train accidents of all kinds, as might be expected, seem to fluctuate to a considerable extent with traffic, although a decrease in the maintenance of way causes of train accidents in 1939, as compared to 1938 (although 1939 was a year of considerably more traffic than in 1938) indicates a favorable trend for this department.

Of the 709 train accidents caused by defects in or improper maintenance of way and structures in 1939, 5 were collisions, 694 were derailments and 10 were miscellaneous train accidents. These accidents were responsible for 7 deaths and 136 injuries. All of the deaths occurred to trainmen, while 99 of the injuries occurred to passengers on trains and 43 of the remainder occurred to trainmen. Of the five collisions, a bent or sprung switch point, uneven superelevation of track and improper surface of track caused one each, and two collisions were caused by defects or improper maintenance not classified.

Of the 694 derailments attributed to improper maintenance in 1939, defects or improper maintenance of rails and joints caused 290, of which 229 were caused by broken rails, and 38 from rails spreading. Fifteen derailments were caused by broken, defective or improperly maintained rail joints or broken bolts, four were caused by rails with base breaks, one by a split head and one by other forms of rail failure not due to wear. Two derailments were caused by rails giving way or causing accidents because of their worn condition.

In the miscellaneous group in this table, which classifies the causes of 204 derailments, 55 derailments were charged to uneven superelevation of track, 45 were caused by improper surface of track, 18 were caused by improper alinement of track, 16 were attributed to track settling, 15 to soft track, and 15 to improper gage. Other causes included low joints, excessive or insufficient superelevation of track, improperly placed or secured guard rails and excessive curvature.

The next largest group of derailments were caused by defects in or improper maintenance of frogs and switches. In this classification, 170 derailments occurred in 1939. Sixty-five of these were caused by bent, sprung, broken or worn switch points, 25 were caused by broken switch lugs, 18 by defective or improperly placed guard rails and guard rail fastenings, 16 by broken, disconnected, bent or sprung switch rods, 11 by defective, broken or improperly maintained frogs, nine by lost motion in the switch, and nine by a loose, broken or defective switch stand or head block. The other causes included broken or defective latches, failure of electric or interlocking parts and other defects or improper maintenance not classified.

Defective or improperly maintained ties and tie plates accounted for 25 derailments in 1939. The causes of these were classified as follows: 17 because of decayed or worn ties, six because of soft or poor quality ties, one because of broken ties and one from other defects. Only three derailments were caused by defective or improperly maintained bridges, culverts and tunnels, and all three of these were caused by structural defects or failure of bridges.

Other Train Accidents

In Table 67 of the accident bulletin, miscellaneous causes of train accidents are classified, a number of which are of interest to maintenance men. Twenty-nine derailments were caused by snow or ice on tracks, 29 were caused by landslides, boulders, etc., 26 were caused by a combination of irregular track and improper loading of cars, 14 were caused by a combination of improper side-bearing clearance and track irregularities or improper superelevation, 12 were caused by ballast or roadbed washed out by rain or floods, 12 were caused by a combination of a worn flange and work switch point, five were caused by obstacles in a switch or frog and four by bridges, trestles or culverts damaged or washed out by rain or floods. In this group one collision was also attributed to ballast or roadbed washed out by rain or floods. This last named accident accounted for three deaths, all of which were to trainmen, and injuries to 47, of which 34 were passengers in trains.

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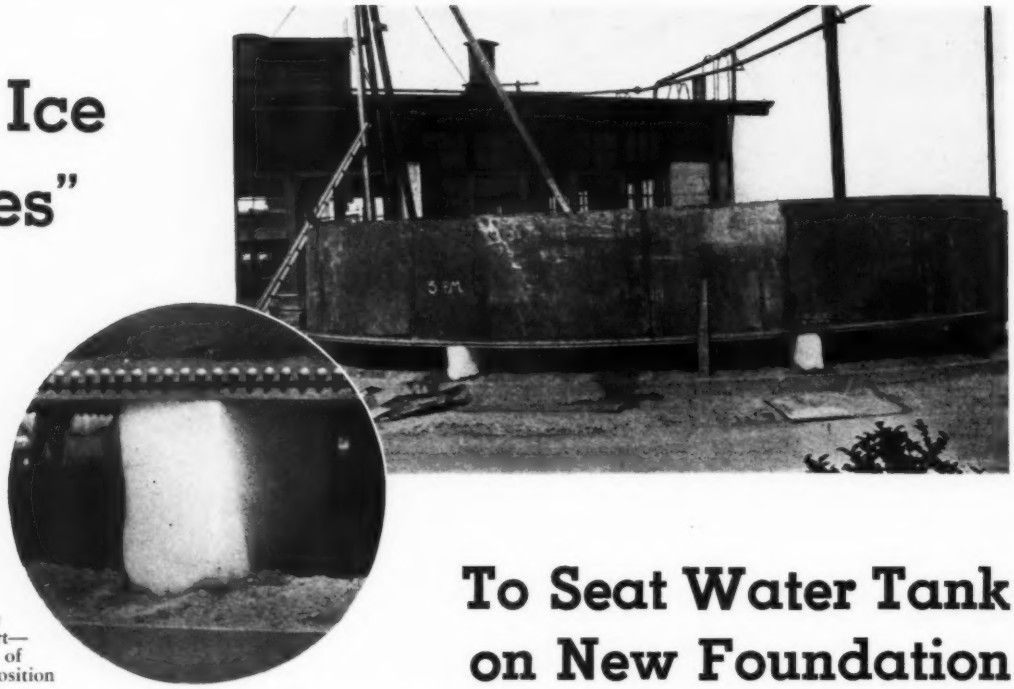
While Section Men Had the Greatest Number of Accidents, Their Casualty Rate Compared Favorably With Other Employee Groups

Uses Ice "Cubes"



Settlement Underway as the Ice-Cake Supports Melt. Insert—A Close-Up of One of the Ice Cakes in Position

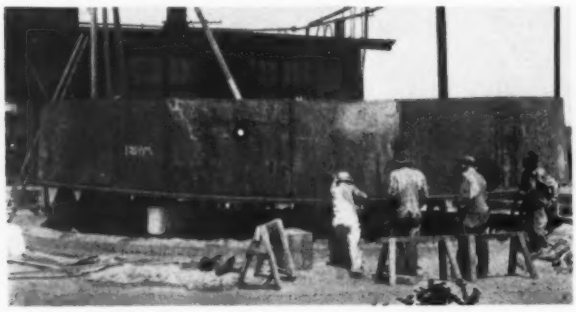
To Seat Water Tank on New Foundation

When refabricating a flat-bottom boiler washout and refill tank of 200,000 gal. capacity at a new location, the bridge forces on the Southern Pacific employed a unique method that proved highly effective and enabled the work to be done at negligible cost as compared with the cost of other methods

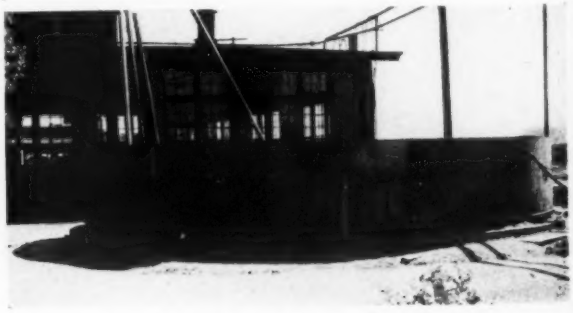
AT a cost of only $3 for ten 300-lb. cakes of ice and relatively little outlay for labor, the Southern Pacific recently down-jacked the base and lowest side ring of a 200,000-gal. steel tank that was being re-erected in a new location, to its new foundation on the ground, overcoming the complicated operations and large labor costs that would have been encountered by any other means. At the same time, through the uniform settling of the tank base with the gradual melting of the supporting ice cakes, the setting up of damaging stresses in the tank plates and riveted joints, with the resulting possibility of leakage, was entirely overcome.

The problem which confronted the Southern Pacific was that of re-erecting a 200,000-gal. tank, 35 ft. in diameter and with a flat bottom, at its engine terminal at Roseville, Cal., for use as the water storage unit in the locomotive blow-down, boiler washing and boiler refill system at this point. Specifications for the re-erection of the tank, which was replacing a no longer serviceable wood tank, called for placing the tank on a sand foundation at the ground level, the sand to be retained by a low concrete wall or curb. This requirement, in combination with the fact that refabrication of the tank bottom had to be carried out at a level above the ground in order to permit riveting operations, brought about the necessity for lowering the tank bottom subsequently to uniform support on the sand foundation. It was recognized that this could be accomplished with jacks, employing cribbing and possibly wood or steel stringers, as necessary, but it was evident that this method would involve a large amount of labor and material, and, unless done most carefully, might set up damaging stresses in the tank bottom.

As an alternative to this method, the idea was hit upon of utilizing the high compressive strength of cakes of ice, with their natural characteristic of slow melting, to support the tank



Lowering the Tank on the Cakes of Ice



In 20 Hours the Tank Was Fully Seated

bottom, while at the same time allowing it to lower uniformly to its new foundation. This method was adopted and, as the result, the actual lowering operations were accomplished successfully in about twenty hours, largely during the night, with practically no expense for labor and a cost of only about $3 for the ice involved.

Fabricated Above Ground Level

Following the construction of the sand foundation and its concrete retaining curb, which was the first work involved in the re-erection of the tank, the bottom and lowest ring of side sheets were refabricated into the tank base while being supported on cribbing and wooden horses at a level about three feet above the foundation. This permitted workmen free access beneath the tank for riveting operations and for subsequent painting of the sheets and rivet heads, the supporting members being adjusted in position to this end as was necessary.

Carried out in this manner, the actual fabrication of the bottom presented no particular problem. When completed and ready to be lowered, ten 300-lb. cakes of ice were purchased from the Pacific Fruit Express Company and were spaced uniformly around the outer edge of the tank base. With these in place, the bottom of the tank was jacked up slightly to free the cribbing and horses and permit their removal, and was then lowered onto the ice cakes. Cleared of the tank-supporting materials other than the ice, the sand foundation was smoothed off to insure full bearing for the tank bottom, and nature was then allowed to take its course in melting the ice and lowering the tank bottom into its final position.

Settled Uniformly

On the day that the lowering operations were undertaken, the work of transferring the load of the tank bottom from its working supports to the ice cakes was completed about 2 p.m. By 4:30, 2½ hours later, under the temperature of about 100 deg. F. prevailing at the time, the tank bottom had lowered about six inches with the melting of the ice, almost in a truly horizontal plane, as had been expected. The only precaution that was necessary during the lowering operation was to protect certain of the ice cakes against the direct rays of the sun to prevent uneven melting. This was done by setting up shields of scrap plywood or corrugated cardboard. By the following morning, with no other work on the part of the tank-erection forces, practically all of the ice had disappeared, and by noon the tank was in final position on its foundation. Final fabricating operations were then resumed immediately to complete the re-erection work.

Credit for evolving this unique method of lowering the tank belongs to Andrew J. Pfeiffer, bridge and building foreman, who was in immediate charge of the work. The work was done under the general supervision of L. A. Warren, bridge and building supervisor, and under the immediate supervision of W. F. Turner, division engineer, with headquarters at Sacramento, Cal.

Railroading in Brazil

By DR. OCTACILIO PEREIRA
Director General, Rio Grande do Sul, Brazil

Chief officer of the Rio Grande do Sul, visiting the United States with a party of departmental officers to make purchases and to study railway conditions in the United States, tells members of the Maintenance of Way Club of Chicago of the standards and methods in his country

BRAZIL is a South American country which you in the United States of North America already know for its riches, products, and activities. It has a territorial area of 3,282,436 sq. mi., a population of 45,000,000 inhabitants, and a sea coast extending for more than 3,728 mi. along the Atlantic ocean. It is the third country in the world in territorial area, following Russia and Canada; it is larger than China, the United States or India.

There are at present about 26,720 miles of railroads in Brazil, the greater part of which are the property of the Federal government, which operates them directly or leases them to state governments or to private companies. A few foreign companies operate railroads which they have built. Some of the private companies that lease lines from the government also own their own lines, built and operated at their own expense.

Six Principal Roads

The principal railroads of Brazil today are the Central Railroad of Brazil, which is about 2,240 mi. long, with gages of 5 ft. 3 in. and 3 ft. 3⅜ in., serving the states of Rio de Janeiro, Minas Geraes and Sao Paulo; the Mineira Railroad, 2,420 mi. long, with a gage of 3 ft. 3⅜ in., serving the states of Minas Geraes, Sao Paulo and Goyaz; the Rio Grande do Sul Railroad, 2,110 miles long, with a 3 ft. 3⅜ in. gage, serving the state of Rio Grande do Sul; the Sorocabana and Mogyana railroads, each with more than 1,240 miles of lines of 3 ft. 3⅜ in. gage, serving the states of Sao Paulo and Minas Geraes; and the Paulista Company, with more than 930 miles of lines, partly of 3 ft. 3⅜ in gage and partly of 5 ft. 3 in gage, partly electrified, serving the state of Sao Paulo.

On an Electrified Section of the Paulista Railway, Laid With 90-Lb. Rail

Measures are being taken gradually to bring about the standardization of the gages. The building of additional railroad lines is going on with relative intensity in various areas, largely by the Federal government, which is at present completing a railroad connection with the neighboring state of Bolivia at Santa Cruz de la Sierra.

Of the 21 states into which Brazil is divided geographically and politically, the state of Rio Grande do Sul is in the extreme South, bounded by the republics of Uruguay and Argentina, as well as by the Brazilian state of Santa Catarina. Its territorial area is 109,000 sq. mi., and its population is approximately 4,000,000. It has a sea coast on the Atlantic ocean extending over 620 miles, and a sea port in the city of Rio Grande, which is well developed.

This Parabolic Arch Bridge on the Rio Grande do Sul Has a Span of 394 Ft.

Rio Grande do Sul Railway

The Rio Grande do Sul Railroad constitutes the state railway system belonging to the Federal government. The state leases the railroad on a contract basis for 90 years, and operates it. A small part of the system is represented by branches built by the state itself. The entire road, as already mentioned, is 2,110 mi. long, with a trunk line running across the entire state from east to west, and with other less important lines extending from it to the north and south. It connects the ports of Rio Grande, Pelotas and Porto Alegre, and transports the principal products of the state, establishing commercial and cultural interchange with the states of Santa Catarina Parana, Sao Paulo and Rio de Janeiro.

Freight trains on the Rio Grande do Sul have an average speed of not less than 18.6 miles an hr. Passenger trains travel at a minimum speed of 21.7 miles an hr.; have an average speed of 27.9 miles an hr.; and a maximum speed of 37.2 miles an hr. These latter trains are composed of comfortable first and second-class coaches and dining and baggage cars, with Pullman sleepers on the night trains. Railway service is being developed to meet the competition that is already being felt from bus companies. Passenger traffic was notably improved on some lines with the introduction of streamlined gasoline motor cars, 23 of which have been manufactured in our railroad shops. They are comfortable cars with seats for 42 passengers, in addition to a small baggage compartment, and are driven by 90- and 120-hp. motors.

Permanent Way Department

The permanent way department handles the maintenance of the track, bridges, buildings and hydraulic and sanitary facilities. The rails, according to the importance of the lines, weigh 40, 46, 50, 60 and 75 lb. per yd. and are 22 ft. 11⅝ in., 32 ft. 9¾ in., and 39 ft. 4-7/16 in. long. We have now adopted a rail section weighing 75 lb. per yd. and 52 ft. 5-15/16 in. long. The rails over a large part of the road show pronounced wear and batter. Therefore, the cropping of rail ends is being resorted to where the worst conditions prevail, cutting 11-13/16 in. from each end, so the rails can be used again. This is a very expensive measure, but the lack of new rail for renewals has made it necessary. The road recently ordered rails from the Inland Steel Company, of Chicago, for 174 miles of track, although about 1,055 miles are needed, either because of the condition of those in service, or because of their light weight.

A Difficult Point of Railway Operation and Maintenance in the Mountains of Brazil

Ties of many different kinds of wood found in Brazil have been used over the system. Untreated, they have a maximum life of only about eight years. In the future, ties of eucalyptus will be used, cut from the groves of the railroad, which will be treated by processes that are now in course of study.

Large quantities of steel ties manufacured in Belgium have also been used. The first types of these ties to be installed have already lasted more than 45 years, and are still in a perfect state of preservation. We stopped using these ties because of their high cost.

Tie plates are being used on curves of small radius with excellent results, both as regards safety and stability of the track structure. However, the scarcity of steel does not permit standardizing on their use. Switch point protectors are used with good results, as are also anticreepers to prevent the rails from creeping.

The railroad is studying a process for the butt welding of rails, as is already being done by the Paulista Company, which imported equipment from the United States for this purpose. This is a matter which the road's technicians will study in the United States where experience can indicate safely the proper procedure to follow. Fifty per cent of the lines of the road are already ballasted with gravel. Unfortunately, this work was not done during construction, as its cost appeared too burdensome. This has been demonstrated to have been a grave error.

Unfortunately also, many miles of the railroad are defective because of economies sought during the period of its construction, which permitted heavy grades and curves of short radius. As a result, operation is difficult over many miles of line and roadway maintenance is frequently troublesome. Maximum grades are 3 per cent, and the sharpest curves (11 deg. 39 min.) have a radius of 492 ft. However, there are long tangents, some of which are more than 12.4 miles long, and long level stretches that permit favorable operation. We

are trying to correct the unfavorable features on the road, and to this end are now carrying out important improvements at a cost of about $4,000,000, much of the work having already been completed. As a result, locomotives that could formerly pull only 250 tons in certain territories, can now pull freight trains of 700 tons.

Bridges and Water Service

The railroad has more than 2,000 bridges with spans greater than 32 ft. 9¾ in. The majority of these bridges are of metal, but some of those constructed in more recent years are of reinforced concrete. Among the metal structures, the most outstanding include: that over the Santa Maria river, of the center cantilever type, 5,420 ft. long; that over the Ibicuhy river, which is 3,610 ft. long; that over the Taquary river, of the cantilever type, which is 1,312 ft. long; and that over the Sao Goncalo river, constructed by an English company in 1888, which is 984 ft. long. Among the more important reinforced concrete bridges is the one built recently over the Toropy river, which has a parabolic arch span, 394 ft. long, with a height of 49 ft. above the average water level.

A special department is in charge of the construction of new work, such as line changes, bridges and stations, and it has under its supervision a well-equipped shop for the strengthening of metal bridges. This latter class of work has had extensive development on the railroad and all bridge strengthening is executed with great skill, making the most effective use of existing material. All the bridges on the railroad are being reenforced or replaced to permit widening of the track gage. That this is being done effectively is seen in the fact that, as a general rule, bridges weighing up to 100 tons are being changed out in two hour's time, without interfering with train operation.

Railway water supply service on the Rio Grande do Sul, which is handled by the permanent way department, is largely by gravity, but we have large steam and electric installations. Much of our water for boiler use is treated directly within locomotives with satisfactory results. Water tanks, usually on reinforced concrete towers, distribute the water.

The Rio Grande do Sul has 14,000 employes, including technicians and office and operating personnel. Its administrative organization is now based on the departmental system, but due to its growth and development, the road will soon adopt the divisional system, which is already being used by the Paulista Company.

Rail Production Makes Further Gain

(Continued from page 478)

weighing 136 lb. and heavier, was production smaller than in 1939, being 24,046 tons, compared with 34,375 tons in the earlier year.

Although the sections weighing less than 100 lb., represented only about one-fourth of the total tonnage of rails rolled in 1940, the largest increases, relatively, were in these sections. Production in the classification range from 85 lb. to, but not including, 100 lb. was 225,006 tons, compared with 63,598 tons in 1939, an increase of 161,408 tons, or 254 per cent. The next classification, over 60 lb. and less than 85 lb., showed an increase of 94,653 tons or 473 per cent, the production having risen from 20,013 tons in 1939 to 114,666 tons in 1940.

As has now been the case for almost three decades, the bulk of the rails produced in 1940 were from open-hearth steel, the tonnage being 1,629,344 or 97 per cent of the total. The production of rails from Bessemer and electric steels was insignificant, amounting to only 683 tons, and all of the rails rolled from these steels were 60 lb. or lighter.

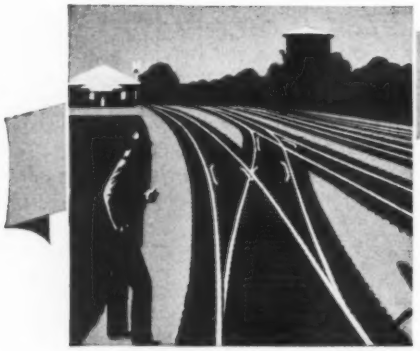
In addition to the 1,629,344 tons of rails rolled from new open-hearth steel, the total production for the year included 45,511 tons rolled from old rails and 3,448 tons rolled from new seconds, making a total of 48,959 tons of re-rolled rails. Also included in the total production of 1,678,986 tons, were 27,662 tons of girder and high T-rails, and 172 tons of alloy-steel rails, the latter representing the smallest tonnage of such rails rolled in more than 20 years, and indicating the passing of rails of this type.

Analysis of M. of W. Accidents

(Continued from page 481)

In 1939, in accidents involving moving cars or locomotives 36 persons were killed and 175 injured by coming in contact with fixed structures above or at the side of the track. Of these totals, 13 killed and 131 injured were employees on duty. These accidents involve structures, for whose installation, maintenance and protection, the maintenance of way and structures department is responsible. Seventeen persons were killed and 23 injured by overhead bridges, of which three killed and 17 injured were employees on duty, while the remaining accidents occurred to trespassers. One person was killed and 30 were injured by side members of bridges; of this number, most of the accidents, one killed and 19 injured, occurred to trespassers; 10 of those injured were employees on duty, and one was a person carried under contract. Twenty-six persons were injured by switch stands, lamps, targets, dwarf signals, etc., of which 19 were employees on duty, six were trespassers and one was a train passenger. Two employees were killed and 12 persons were injured by coming in contact with platforms, 10 of the latter being employees on duty and two were trespassers. One trespasser was killed and 11 employees and two trespassers injured by water and fuel oil standpipes and spouts. Other causes include striking coal chutes, aprons, docks, etc., used for company fuel; fences and cattle guards; mail cranes; overhang at station or other buildings; telegraph, signal and light poles; scale housings; signal arms or other parts of signal apparatus; stock chutes or pens; tunnels (only four accidents at tunnels, in 1939, but all were fatal); warning guards or ticklers and overhead wires or pipes.

In Table No. 80, the bulletin lists miscellaneous train-service accidents not elsewhere classifiable, among which are a number which are of direct interest to maintenance men. Included in this list are hand and motor cars struck by locomotives or cars, causing 15 deaths and 22 injuries, of which 13 deaths and 19 injuries were to employees on duty; one death, and one injury to employees not on duty; one injury to a trespasser, and the remainder, one death and one injury, occurred to other non-trespassers. Falling off or through bridges, trestles or culverts not equipped with footwalks or handrails accounted for three deaths and 10 injuries, of which one death and seven injuries occurred to employees on duty, one death to an employee not on duty, one injury to a traveler not on a train and the remainder to trespassers. Falling off bridges, trestles or culverts equipped with handrails or footwalks caused only two injuries, both of which occurred to employees on duty. Stepping or tripping on ties, rails, ballast, etc., which were a part of the track, caused one death and 149 injuries, all of which occurred to employees on duty, except eight injuries to travelers not on trains, one to persons carried under contract, and three to trespassers. Falling or tripping over material, lumber, ties, rail, etc. (not a part of the track structure), caused two injuries, both of which occurred to trainmen on duty.



WHAT'S the Answer?

Should the Rails Be Kept Even?

When laying rail on single track, is it better to lay one side one day and the other on the following day, or to lay both sides the same day? On double track, where the track is "killed" during the rail-laying operation? Why?

One Side—Less Delay

By H. R. CLARKE
Engineer Maintenance of Way, Chicago, Burlington & Quincy, Chicago

Where rail laying is organized, as it is now on most roads, with a large gang supplied with a full complement of work equipment to expedite the work, there is generally less delay when the new rail is carried through on one side for the entire day. If this is done, the equipment can be pulled back at the close of the day's work, prepared to start on the following day. There is another advantage, in that the equipment, particularly adzing machines, is adjusted to the height of the rail on which it is working. Usually, the rail that is coming out is lower than the rail that is going in, thus making adjustments necessary when these machines are changed from one side to the other, and by working all day on one side the number of times this adjustment must be made is reduced.

Obviously, the procedure must be varied to fit conditions. If switches are encountered about the middle of the day, it may be better to move back at noon and bring the other side forward in the afternoon so as to be ready to start through the switches on the following morning. These are decisions that must be made on the ground by the man in charge of the gang. In general, however, some saving in time can be made where the laying of the new rail is carried through on one side for the entire day.

There may be objection to this plan if there is considerable difference in the height of the new and old rail. Usually, this difference is not so great that it need be considered as serious, however. It is desirable to reduce the speed of trains on newly laid rail until the tie plates have become seated and the rail has adjusted itself. This speed restriction, which is desirable anyway, overcomes objections that might otherwise arise because of the difference in the height of the new and old rails.

The problem is much the same on double as on single track. Since the track upon which the rail is being laid will undoubtedly be in service over night, the only difference will be that on single track several trains may be expected to pass over the track during the day, which will not occur on double track if the track is "killed" during the working hours.

Answers "Why" First

By C. W. BALDRIDGE
Assistant Engineer, Atchison, Topeka & Santa Fe, Chicago

Rail should be laid on one side of the track on one day and on the other side the following day, because it is advisable, and usually necessary, to adze the ties before the new rail is laid. The new rail will then settle the tie plates into place under the first few trains that pass over it. By laying one side only on one day and the other side the next day the newly-laid rail will be well settled into place by the trains that pass over it during the night, thus providing for more accurate gaging of the track as the second line of rails is laid. This is particu-

Send your answers to any of the questions to the What's the Answer Editor. He will welcome also any questions you wish to have discussed.

To Be Answered in September

1. *What details are most important when laying rail, to insure best results? How should they be supervised?*
2. *When renewing asphalt or composition shingles, should the old shingles be removed, or should the new shingles be laid over the old? Why?*
3. *How many men should be assigned to gathering, sorting and loading released and surplus material after a rail gang How should they be organized?*
4. *In view of the present limitations on the placing of slow orders by reason of faster schedules, what provision should be made for the protection of bridgemen when working under traffic?*
5. *Are fire guards along the right of way desirable? Under what conditions? How should they be made? Of what width? Where located?*
6. *What effect does the treatment of water have on pipe lines, valves and water columns? How can the trouble be overcome?*
7. *Is it practicable to dispose of old ties to residents along the line? If not, why? If so, under what conditions? Are there objections to the practice?*
8. *What can be done to keep insects away from fresh paint?*

larly important where ribbed-bottom tie plates are used, but it is advisable in all cases.

Rails that are laid on the first side should be gaged to the old rail at only two points on tangents, thus allowing the new rail to be spiked straight, avoiding the reproduction of any kinks or bends that may exist in the old rails. When laying the second side of the track, the new rail should be gage spiked at more frequent intervals.

Newly laid rail should be covered by a slow order for the first night after it is laid, whether one or both sides of the track are freshly laid. This will allow the new rails to settle into place before they are subjected to severe shocks from high-speed trains. These same principles apply, whether the rail is being laid on single or double track and whether the track is taken out of service.

Makes Little Difference

By W. H. Sparks
General Inspector of Track, Chesapeake & Ohio, Russell, Ky.

Nothing is lost if one side of the track is laid on one day and the opposite side is laid the next day. Neither is there any fundamental reason why both sides cannot be laid during the same day, laying one side in the morning and the other side in the afternoon. However, if trains are allowed to pass over the first line of rails before the second line is laid, a better job of gaging is likely to result. This applies equally to single and multiple track, but if the track is "killed" during the working hours, there will be no opportunity for the first rails to settle until traffic is turned back at night, so that the shift from one side to the other should be made on alternate days.

If there is a marked difference in the height of the old and the new rail it may be desirable to keep the two sides reasonably even, but this difference is usually negligible from this point of view. Again, if slow orders are not permitted in high-speed territory, the two lines should be carried forward on the same day. If this is done, there may be some lost motion in getting the equipment back, but it must be taken back in any event, whether both sides are laid during one day or on alternate days. One of the important objectives in laying rail is to do the work in such manner that it will not be damaged in the process, or subsequently, as a consequence of the character of the workmanship. For this reason, the decision as to how the work shall be carried out can best be left to the supervisor and foreman of the gang, under the direction of the division engineer and other officers who are interested in the general operation. Too many details are influenced by local conditions to make a general rule that must be followed rigidly.

Cleaning Stucco Surfaces

What practical methods can be employed to clean exterior stucco surfaces? Interior stucco surfaces? What precautions should be observed?

Use Steam and Water

By Frank R. Judd
Engineer of Buildings, Illinois Central, Chicago

First, clean the stucco with steam and water under pressure. After this has been done, the stucco should be painted with a standard paint of the cement waterproof type, applied with a fibre brush, with a circular movement, to work the waterproof cement into the pores of the stucco thoroughly. It is important that the stucco be kept thoroughly wet while this painting is being done, and that the surface that is being painted shall be covered in one operation. That is, a part of the surface should not be painted one day and the remainder painted the next day. This cement waterproof paint can be obtained in white or colors.

It requires special equipment to clean stucco by this method, and as such jobs come up only occasionally, it is usually more economical to arrange for a contractor who makes a specialty of cleaning stucco to do the work than it is to rig up the equipment and do only one or two jobs in a season with company forces. While this is a rather expensive way to clean stucco, I believe that it is the only one that will prove to be thoroughly satisfactory in the long run.

Use Fibre Brush

By E. C. Neville
Bridge and Building Master, Canadian National, Toronto, Ont.

A method that is employed frequently for the cleaning of exterior stucco surfaces is to wash them with a solution made by dissolving one-fourth pound of washing soda (sal soda) in a gallon of water, applying it and scrubbing them thoroughly with a stiff fibre brush. If the dirt is particularly difficult to remove it may be necessary to use a stronger solution or to go over the surfaces several times. If the condition of the surface is such that this does not produce the desired results, it may be necessary to resort to wire brushes.

Where the soda or other agent is used for cleaning, after the surface is cleaned, it should be washed thoroughly with clear water, applied either as a spray or with a soft brush. If the surfaces have been painted, they may be cleaned in the same manner, but care should be taken to remove all loosened paint and cement, and all cracks should be filled before repainting. The surfaces should be completely dry before the paint is applied, unless it is a cement paint, in which event they should be well wetted.

Avoid Bleaching

By L. G. Byrd
Supervisor Bridges and Buildings, Missouri Pacific, Poplar Bluff, Mo.

Under the most favorable conditions the cleaning of stucco surfaces is not an easy task, and experience has shown that the most practical method for cleaning rough exterior surfaces is the use of steam and water under pressure. However, there are several cleaning compounds that are recommended for use where the surfaces are unusually dirty or are covered with a film of grease or oil, as sometimes happens with railway buildings. In such instances a light soap solution may be used with satisfactory results, but care should be exercised where soap or other compounds are employed to avoid damaging the mortar or the stone trimming, for such compounds are prone to cause bleaching which usually occurs in the form of whitened streaks.

Smooth stucco surfaces can usually be cleaned by hand methods, using a light soap solution applied with scrubbing brushes. However, progress necessarily is slow when hand methods are employed, and this is reflected in increased cost. For this reason, a considerable saving can be made through the use of vapor cleaning machines, a number of designs of which are on the market. Whenever

an exterior stucco surface has been cleaned, it should be painted with a cement waterproofing paint, as this will not only protect the stucco, but will prevent the infiltration of water through the stucco.

Hand methods must be employed ordinarily for cleaning interior stucco surfaces, since the use of steam cleaning machines in closed rooms is unpleasant, at best, and may be wholly impracticable if the room is small, or in rooms that must be occupied while the cleaning is under way. It is desirable to use a mild soap mixture, although there are a number of compounds that are claimed to be as good.

An exterior stucco surface that has been painted with a waterproofing material is much easier to clean than an untreated surface. For this reason I am in favor of giving such surfaces a waterproof treatment to facilitate cleaning as well as to prevent moisture getting into the stucco and damaging the metal lath or other reinforcement. Where either exterior or interior stucco surfaces have been prepared for painting or repainting by cleaning them thoroughly, a saving of from 25 to 40 per cent can be realized in both labor and material and the appearance of the surfaces will be greatly improved.

Distributing Anti-Creepers

Should anti-creepers be "bunched" at certain points or distributed evenly throughout the rail panel? Why?

Space Them Evenly

By G. S. Crites
Division Engineer, Baltimore & Ohio, Punxsutawney, Pa.

The purpose of anti-creepers is to hold rails against longitudinal movement and to maintain the correct allowance for expansion. If change in temperature were the only cause for rail creepage, it would be proper to bunch the anti-creepers at the center of the panel, where they would allow the rail to expand freely toward the ends. In this event, the anti-creepers should be faced equally in both directions. The fact is, however, that rail creeps mostly from causes other than changes in temperature.

Probably the most pronounced movement results from wave motion induced by rolling loads over a yielding roadbed; rail creepage is always more pronounced when the track is laid across a swamp. In such stretches it may be necessary to apply more anti-creepers to the rail panel than is necessary on firmer ground, and to insert blocks or tie spacers between the ties so that the track must move as a whole, if it moves. If this does not provide sufficient resistance, it may be necessary to anchor the track to piles or to hold it by other means.

Although the most pronounced creepage occurs as a result of wave motion under the rolling loads, the most common cause is the traction from train braking, which tends to pull the rails in the direction the train is moving. This action is evenly divided along the rail and can best be resisted by distributing the anti-creepers evenly throughout the rail panel, to hold it against the force imposed by and acting in the direction of the braking. Conversely, the tractive effort of locomotives has a tendency to pull the rails in the direction opposite that of traffic. In some places where other causes of rail creepage may be equalized, there may be creepage against the current of traffic, and this can best be overcome by applying anti-creepers as needed throughout the rail length.

Anti-creepers will function best when they are distributed evenly throughout the rail panel, except in those rare cases where they are used for expansion anchorage only, in which event they will be grouped at the center of the rail panel.

Will Help to Hold Gage

By H. G. Carter
Division Engineer, Central of Georgia, Columbus, Ga.

Anti-creepers should be distributed evenly throughout the rail panel, to relieve stress on the ties, to provide more ballast cribs to resist the forces that cause creeping, and to distribute the stresses in the rail more evenly. An even distribution of the anti-creepers will assist in keeping the anchor ties on their bed and will help to preserve gage where the rail shows a strong tendency to creep. The anti-creepers should be applied so that opposite anchors will be against the same tie. When there is a shortage of anti-creepers and rail joints are slot spiked, it becomes necessary to place anti-creepers opposite the joint, but this puts excessive strain on the joint ties. Where sufficient anti-creepers are available, anchorage opposite the joints should be avoided.

Must Hold Expansion

By W. H. Sparks
General Inspector of Track, Chesapeake & Ohio, Russell, Ky.

Obviously, the purpose of anti-creepers is just what the name implies, to prevent the creepage of the rail. As a corollary, one of the important functions they perform is that of maintaining a uniform allowance for expansion. Experience has shown that both of these functions are performed to better advantage if the anti-creepers are distributed evenly throughout the rail panel. The holding power seems to be greater, the gage, line and surface can be maintained more easily and the ties show less tendency to slue. Because most rail will tend to move backward at times, it is often advisable to anchor the track against movement in both directions. It is fully as important to have enough anti-creepers to the rail panel as to see that they are distributed correctly.

Anchor Both Ways

By L. D. Gardner
Roadmaster, St. Louis-San Francisco, Ada, Okla.

Anti-creepers should never be bunched or placed opposite joints. Either method of application will cause the ties to slue, and will affect both line and gage and cause poor riding track. They should always be distributed evenly throughout the rail panel, with sufficient anchorage to insure against movement of the rail. I would suggest four as the absolute minimum, with an equal number placed on the opposite side of the tie, for rail should be anchored in both directions.

Do Not Bunch

By W. H. King
Section Foreman, Missouri Pacific Lines, Francitas, Tex.

Anti-creepers should never be bunched, but should be distributed evenly throughout the rail panel, with one on each side as well as on each end of every anchor tie. This will hold the ties straight and will overcome the tendency the rail so often exhibits to run against the normal direction of creepage. If the anti-creepers are bunched, the rail may show a decided

tendency to kink between the points of anchorage when the rail gets hot, and this will cause bad gage and line. If the anti-creepers are bunched the ties will also bunch, causing the ties to be loose on their beds, which will necessitate more labor to keep the track in surface and the ties spaced.

Replacing Burned Trestle

Where a pile trestle has burned, is it preferable to redrive it or to erect frame bents on the pile stubs? Why?

Recommends Framed Bents

By Julius M. Bischoff
Office Engineer, Terminal Railroad Association, St. Louis, Mo.

It is preferable to erect frame bents for the purpose of restoring a trestle that has been destroyed by fire. If the piles have been treated, as all piles for trestle work should be, considerable life will be left in them, and this will be still greater if they have been charred slightly. Time is an important consideration in the restoration of traffic, and the trestle can be built quicker and opened for traffic sooner by erecting frame bents than by driving piles. A large number of bridge carpenters can be engaged in framing and erecting the bents, and placing the deck, whereas only a limited number of men can be employed at one time if the bents are being driven, and these must await the driving of a bent before they can cap it and place the stringers. Furthermore, a crane can be used to better advantage for handling the timbers than is possible with a pile driver.

Pile Driving Slow

By H. Austill
Chief Engineer, Terminal Railroad Association, St. Louis, Mo.

It is almost always possible to rebuild a burned trestle more quickly with framed bents than by driving piles, and usually time is pressing where trestles have burned. Of course, if the traffic does not justify a rush to rebuild the structure and ample time is available for driving piles, it will be preferable to redrive the trestle. However, it is difficult to conceive a situation of this sort, unless it be on an unimportant branch line.

Piles must be driven one at a time and, unless more than one driver is available, progress in rebuilding will be limited by the rate of pile driving. Assuming that the structure is to be redriven and that time is pressing, there will be great temptation to under-drive the piles and thus leave bents that will cause trouble from settlement later. When rebuilding a trestle by redriving the piles, the number of men that can be used to advantage is limited and, therefore, the time will be extended for this reason as well as by the necessity for waiting on the pile driving. On the other hand, if framed bents are to be set on the old pile stubs, one crew can be cutting off the old piles, one can be framing the bents, another can erect them, while still another can be building the deck.

These suggestions are based on the assumption that the road has an organization and a supply of emergency material that will make such progress possible. The uninterrupted flow of traffic on a railway is worth a great deal in direct transportation costs, in savings and in maintaining the good will of its customers. These items will usually greatly exceed the cost of driving a trestle after the line has been reopened for traffic by reconstructing the trestle with framed bents.

Framed Bents Reduce Time

By L. G. Byrd
Supervisor of Bridges and Buildings, Missouri Pacific, Poplar Bluff, Mo.

Where a long trestle has been destroyed by fire it is impracticable to operate more than one track driver at each end of the opening. The piles must be driven, the bents cut off and capped, and the deck must be carried along ahead of the pile driver. These are time-consuming operations which can rarely be tolerated on a busy line. If framed bents are used instead of pile bents, larger forces can be employed and in many cases the work can be started at several intermediate points. This will reduce the time necessary to re-open the line by one-fourth to one-half.

I recall a trestle, 1,800 ft. long and 15 to 30 ft. high which was destroyed by fire several years ago. A pile driver was operated at each end of the gap, and other forces were set to work at three intermediate points, framing bents and erecting them with gin poles, while separate units placed the deck timbers. A better way to erect the bents today is by means of crawler cranes, which were not available at the time this bridge burned. The time consumed in restoring traffic was less than 50 per cent of the estimated time when the work began. At times, while one bent was being driven, one of the crews was able to frame the next one, and at this end of the work many of the bents were alternately pile and framed bents. In another case, involving a trestle 560 ft. long and 14 to 20 ft. high, by erecting all framed bents the structure was made ready for service in 27 working hours.

My experience causes me to believe that the erection of framed bents on pile stubs is the quickest way to restore traffic where a timber trestle has been destroyed by fire. In many cases, the temporary structure thus erected can be maintained for the full life of the material.

Time An Element

By Engineer of Bridges

When a trestle is burned out, the division officers must decide quickly on the method of replacement and assemble men, material, equipment and tools accordingly. On heavy-traffic main lines and important branches, the first consideration should be that of re-opening the line to reduce the cost of detours and to resume schedules with the minimum delay. The type of structure to be installed is of secondary importance; and one that is safe for operation, even if it demands slow speeds, is preferable to one that complies with the adopted standards of the road, but which will require considerable extra time to construct.

Whether the replacement will be made with framed bents or by driving piles will depend somewhat on the location of the bridge, the height of the bents, the alinement of the track and the condition of the channel. Generally, it is practicable to frame bents where the height is not more than 18 ft. If there is water under the bridge, the depth of the water and the velocity of the current are additional determining factors. Where feasible, it is usually desirable to work from each end of the bridge toward the center, and where frame bents are used, they may also be erected at other points within the limits of the structure. Occasionally a combination of pile and framed bents may be necessary because of varying height of the bents.

Regardless of the method, it is desirable to have a pile driver at each end of the bridge to handle deck or

other timbers when not actually engaged in driving piles. When a trestle burns, it is usually several hours before actual work of reconstruction can proceed, because of the heat of the burning timbers. It is during this period that the plan of action is made and the necessary forces and supplies are moved to the bridge site. It should not be overlooked at this time that frame-bent construction can be effected in about one-half the time required to drive piles.

When an emergency of this kind occurs, a sufficient number of experienced bridge men to expedite the work can seldom be assembled immediately. If framed-bent construction is employed it is feasible to use the bridge men who are on hand for framing the timbers at the point of unloading, marking them for erection, and then drag them to the place of installation, where they can be placed by common labor under the direction of one experienced bridge man. These timbers should be tacked in place with spikes, and bridge men should follow to insert bolts and finish the bents.

The principal objection to frame bents erected under emergency conditions is that the bridge will have to be rebuilt in a comparatively short time. This is generally offset, however, by earlier resumption of traffic. It is, therefore, a matter of judgment which method should be used. On bridges shorter than three or four panels, and less than 18 ft. high, it is usually possible to open the line by framing the bents of second-hand material.

Must Restore Quickly

By G. S. Crites
Division Engineer, Baltimore & Ohio, Punxsutawney, Pa.

When a bridge has been destroyed, the most important consideration is that it be restored quickly. Short spans can sometimes be restored by cribbing before a pile driver or a supply of material can be assembled on the ground; at any rate before piles could be driven or bents could be framed. Cribs are an emergency expedient, however; they tend to settle and work out of line. They should be continued in operation only so long as it takes to replace them with more permanent work. Where the opening is unsuitable for temporary cribs, the next quickest method is to cut off the pile stubs at or near the ground line and erect framed bents on them.

Usually, the backwalls are not burned out, but if they are, new backwalls can be attached to the preframed land bents and lowered into place with them. The framing of the bents and deck timbers should be carried on where they can be reached with a crane, so that the work of setting the bents can progress at maximum speed. If the opening is long, a crane and suitable material at each end will cut the time of restoration in two. Erecting framed bents under emergency conditions, without the use of a locomotive crane, is a back-breaking procedure and should not be undertaken unless absolutely necessary.

It is assumed that pile drivers are available and that the men on the ground are experienced in the construction of pile bents. If the trestle is high, a surprising amount of time will be consumed in cutting off the piles, in girting and bracing them and in getting the caps in place, a loss of time that can be avoided by framing bents and dropping them in place with a crane. Generally, those in charge of the territory are familiar with local conditions, the machines and materials available and the force that can be assembled. They will, therefore, use cribs, framed bents or piles, as may be needed to get the track open in the minimum time.

Running Repairs on Pumps

To what extent is it feasible for pumpers to make repairs to pumps and pipe lines in pump houses?

Should Do All He Can

By J. H. Davidson
Water Engineer, Missouri-Kansas-Texas, Parsons, Kan.

The pumper should make all repairs that are within his power and avoid sending for the repairman, except when absolutely necessary. If the pumper is selected for his dependability and ability to operate properly the type of equipment installed in the pumping station to which he is assigned, he should be capable of making all ordinary emergency repairs to pumps, other machinery and pipe lines. To make this practice effective, he should make frequent inspections of all parts of the plant to ascertain what repairs are needed. Such inspections will permit time to obtain needed materials and make the needed repairs before actual failure occurs. The ability to recognize parts that need replacing before they actually become useless, is most important in the operation of any machinery.

The pumper should be provided with an adequate blueprint or drawing, showing a complete list of repair parts for all of the machinery in his plant, so that he can order quickly the parts needed for any repair job. Valuable time is often lost because the pumper does not give complete descriptions of the parts he needs, unless he has the repair-parts list from which to order. In addition, it is an excellent idea to allow the pumper to keep on hand at the pumping station a few of the parts which experience has shown are required most often. All pump houses should be equipped with sufficient good tools to permit the operator to make ordinary repairs. Experience will indicate just what should be provided in the way of special tools for any particular installation.

Make Running Repairs

By Inspector of Water Stations

Any pumper who is qualified to operate a pumping station has sufficient mechanical ability to care for the pumps, other machinery and pipe lines in his charge and to keep them in good running order. There are few pumpers in railway water stations that do not have considerable spare time on their hands. I have never observed any reason why the pumper should not devote enough of this time to making needed repairs to insure that his machinery and pipe lines will be kept in first class condition. In other words, he should be expected to make all repairs that can be made by one man, calling in the traveling repairman only when the job is too big for him. The engineer in an industrial plant is expected to do this for the machinery and equipment in his charge, and I fail to see in what way the pumper in a railway water station is any different. There is one exception to this general statement, however. Some modern pumping stations have considerable electrical equipment, and it may not be desirable to allow the pumper to make repairs, replacement of parts or adjustments to this equipment.

Every pumper should be given a list of spare parts of all of the equipment in his charge, prepared in such a way that it contains the manufacturer's designation for each part. If this is done, any needed parts can be ordered with assurance that they will

fit when they are received. The pumper should be encouraged to watch his machinery for approaching failure and to order his repairs in ample time so that they will be on hand by the time they are needed to anticipate actual failure. This practice will insure that the plant will always be dependable and will preclude the probability of water failures that sometimes occur by reason of delay in ordering parts until the need for them is immediate. There is no better example of how a "stitch in time saves nine," than in a railway water station, for water failures cannot be permitted to occur, and to prevent them forehanded action is imperative.

Applying Roofing on Concrete

When applying built-up roofing on concrete slabs, what measures can be taken to prevent damage to the roofing by reason of the expansion and contraction of the concrete?

Cover Expansion Joints

By O. G. Wilbur
Field Engineer, Baltimore & Ohio, Baltimore, Md.

When built-up roofing is to be applied to new concrete roof slabs, the expansion joints should be covered with a strip of copper, bent U-shape, to serve as a flashing strip. The roofing felt should then be laid on each side of this strip and mopped down in the same manner as felt is laid to any other flashing strip. Joints in concrete slabs also have been covered with a narrow strip of felt laid loosely over the joint, with a second and wider strip of felt laid over this, having a width sufficient to permit it to be mopped to the concrete slab for about 4 in. along each edge. The roofing is then laid and mopped into place over this second strip. No other provision is introduced, ordinarily, to allow for expansion of the concrete slab.

When roofing is to be replaced, and the built-up roofing is being applied to old slabs, and cracks are found in the slabs, which have developed from expansion and contraction, a strip of felt about one-half the width of the roll might be laid over each crack and spot fastened along one side of the crack only. The new felt should then be mopped in place over this loose strip in the usual manner.

Recommends Insulation

By General Building Inspector

Expansion joints in concrete construction present a problem that has never been solved fully and satisfactorily, whether waterproofing or roofing is to be applied over them. Expansion joints in concrete roof slabs rarely have as much movement in expansion and contraction as bridge slabs, for they can usually be spaced at closer intervals. If insulation is applied over them, as I believe that it should always be, the temperature range in the slabs will be less and the movement will be reduced correspondingly.

Obviously, if the roofing is mopped across an expansion joint, the roofing material will be ruptured when movement in contraction separates the slabs sufficiently to put a heavy strain on the material. This can be overcome by providing an area of slip wide enough on each side of the expansion joint to allow the resilience in the material to overcome the stresses thus created. In the few roofs I have installed on concrete roof slabs I have laid a full width of roofing felt over the joint, centering it over the joint, without mopping. Over this strip and mopped to it, a half width, also centered, is mopped on. Next, two full widths are laid, the joint between them being over the expansion joint, and mopped to the strips already down, but not to the slab. Finally, the roofing is applied in the usual manner, each layer being mopped to the roof or the preceding ply.

This gives two full widths of roofing felt that are not fastened to the slab, which, so far as my experience goes, is sufficient to avoid rupture of the felt over the joint. Normally, it seems to be as effective as a U-shaped copper strip filled with plastic material, into which the roofing is depressed to provide sufficient slack to overcome the movement of the slabs.

Power Tools for Section Gangs

To what extent is it practicable to provide section gangs with power tools?

All That Can Be Used

By George E. Lowe
Engineer of Track, Delaware, Lackawanna & Western, Scranton, Pa.

The question of providing section gangs with power machines and power tools depends almost entirely on the size of the gangs, but on the character of the track, the kind of ballast and several other factors. The present tendency is to lengthen sections and reduce the size of the section gangs. The heavy items of maintenance are being done with large extra gangs, where this is possible, because they can use power equipment to better advantage than the small section gangs can.

However, on many roads the section gangs still do the real maintenance work, and here the problem of providing power tools is not so easily solved. These gangs range in size from a foreman and two laborers to a foreman and, say, 12 to 15 laborers, depending on the organization deemed advisable by the individual roads.

Bolting machines, tie tampers, welding equipment, grass burning and mowing machines and joint oilers can be used by section gangs, provided the organization is built up to tie in to advantage with the machinery available. Maintenance costs can be reduced materially by passing these units of power equipment from one section to another. Owing to the present and the prospective labor situation, it is advisable to set up an organization on each division to use as much power machinery as possible, and in this way, the several machines can be passed from section to section with good results.

To A Limited Extent

By F. H. McKenney
District Engineer Maintenance, Chicago, Burlington & Quincy, Omaha, Neb.

Power tools can be provided for section use to only a limited extent. The development of power tools of types that can be used to advantage on the average section is so recent that comparatively little has been done along this line. Most of the power tools heretofore in use have been

those suitable for specialized gangs, and until recently these units were large and cumbersome and could not be adapted for use by small gangs.

It is often difficult to justify an expenditure for power tools for section use, as the wide variety of tasks that fall to the lot of the section gang would result in a large amount of idle time for the power tools, and a small return on the investment. It seems more likely that power tools can be made available to serve several sections on a roadmaster's or supervisor's district, rather than to assign them to individual sections. In this way a smaller number of tools could be made to serve a larger territory.

Does Not Favor

By District Engineer

As power tools are developed at present, I am not in favor of assigning them to section gangs, except temporarily in special cases. There are several reasons for this attitude. With only a few exceptions power machines and the power units required for the operation of the power tools, are too heavy and cumbersome for the average section gang to handle. Power machines and power tools are expensive and must be used intensively for the maximum possible time during the year to make their use economically feasible or to provide justification for their purchase. The section gang is a general utility organization, which has many tasks to perform, so that it can seldom keep at any one job consistently. For this reason, any power machine or power tool that may be assigned to it will of necessity lie idle a large part of the time.

On most roads today, the section gang is little more than a skeleton organization, so that even if it were able to use a power unit continuously, there would not be enough saving effected, even when the added productive capacity of the gang is taken into account, to warrant the use of the equipment in this manner. Again, while this may be somewhat beside the point, the average section foreman does not have the experience or expert knowledge necessary to operate power machines. Even if he has the needed qualifications he must keep his attention on the men and the work they are doing, so that he neither can nor will give the machine the care it should have.

There is a discernable trend toward the development of power tools suitable for use by small gangs, and it may be possible that such tools will become available at prices that will make it practicable to assign them to section gangs. Until this development takes place, however, it is my settled conviction that there is no economic justification for the assignment of power tools to section gangs.

Killing Weeds on Shoulder

What are the relative advantages and disadvantages of discing, scarifying and burning for controlling vegetation on the shoulder of the ballast?

Depends on Vegetation

By T. M. Pittman
Division Engineer, Illinois Central, Water Valley, Miss.

Both discing and scarifying produce the same results so far as weeds in the ballast are concerned, for they expose the roots to the sun and air and thus kill the plants. Burning is based on a different principle; it destroys the tops of the plants but not the roots. The comparative results from the two methods will, therefore, depend on the character of the vegetation. Some grasses, such as bermuda grass, nut grass and other similar grasses, are not destroyed by burning the tops, and after a few months fresh foliage will sprout from the roots. Some of the more tender grasses will be destroyed completely by burning but, generally, the benefit from burning will be more or less temporary.

Discing can be used to advantage to turn up the roots in light ballast, but scarifying will give better results in heavy ballast. There are practically no grasses that will not be killed if their roots are exposed to the sun and the air, so that any method that does this will give more lasting results. The benefits will depend, however, on how many of the roots are exposed. Any method of scarifying leaves a large percentage of the roots still covered, and fresh vegetation will almost invariably spring from them. Repeated treatment at short intervals will expose more of the roots and thus permit the vegetation to be controlled within reasonable limits.

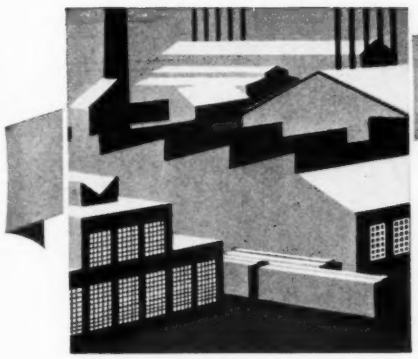
Although the question and the discussion thus far, refers to the shoulder of the ballast section, we cannot separate the shoulder from the ballast in the cribs. Obviously, neither scarifying nor discing reaches the ballast between the ties and inside the rail. This area can be reached only by burning, the disadvantage of which is the damage or potential damage from fire. Some tests have been made that seem to indicate very little loss of creosote in the ties as a result of the heat of the burners. In most cases, however, there are ties that are decayed sufficiently to catch fire. The necessity for extinguishing these fires as well as for preventing the spread of the fire to dry grass on the right of way and to adjacent property, requires a follow-up gang with a water car, which is expernsive. Neither method is entirely satisfactory in the destruction of vegetation.

Factors Not Equal

By District Engineer

None of the methods of weed control mentioned in the question can be expected to destroy permanently all of the weeds in the ballast. For this reason, the method that comes nearest to doing this, all other factors being equal, should be the most satisfactory. It follows immediately, however, that with the three methods mentioned, other factors are not equal. Furthermore, the question confines the discussion to the shoulder of the ballast, presumably because discing and scarifying are thus limited.

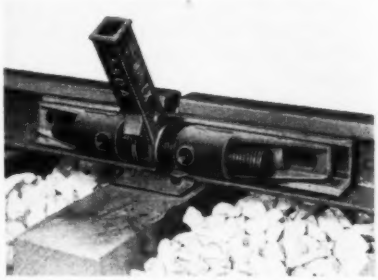
Discing is suitable for gravel, chatts, cinders and other loose material, and is quite effective in stirring up the ballast and in rooting out vegetation, so that the root system is exposed. Roots exposed directly to the sun soon dry and the plant is killed by failure of its moisture supply. Discing is not as suitable for rock, slag or washed gravel ballast containing large stones. While the lighter ballast can be scarified, this method is adapted more particularly for the heavier types of ballast. It is my observation that scarifying is more effective than discing in uprooting vegetation and exposing the roots to the sun. Yet neither discing nor scarifying can be depended on to kill all plants, for some of them will have roots that go deep and that will not be disturbed, while others, although they may be uprooted, will be covered or partly covered as the ballast is stirred and turned over. In most cases this will be sufficient to keep these plants alive, for practically all of the vegetation that grows in ballast is hardy and persistent.



PRODUCTS of Manufacturers

Rail Puller and Expander

TEMPLETON, Kenly & Co., Chicago, has added a new rail puller and expander, the Simplex 550A, to its line of rail pullers and expanders. The No. 550A has a capacity of 30 tons and is similar in construction to



The Simplex No. 550A Has a Capacity of 30 Tons

the No. 550, which has a capacity of 25 tons. The No. 550A is essentially a push-pull screw jack with a screw 2¼ in. in diameter. It is provided with a U-bar which will fit any rail with a height between the ball and base of 3¼ in. or more. In its operation, the No. 550A and the U-bar are placed on the outside of the rail at the joint. Stud bolts, 1⅛ in. or 1¼ in. in diameter, extend through the U-bar, the bolt holes in the web of the rail and washer plates, placed against the web on the inside or gage side of the rail. The bolt holes in the U-bar are slot shaped, permitting the operation of the jack to push the rail ends apart or pull them together. The jack has a travel of 3½ in. to 8 in.

The rail puller and expander is operated by a bar placed in a ratchet socket provided for the purpose. Operation of the bar back and forth turns the screw. Service need not be interrupted when the rail puller and expander is used, since the alloy steel, heat-treated U-bar stiffens the joint and, when the lever socket is in a horizontal position, no part of the assembly protrudes above the level of the top of the rail. The rail puller and expander is said to save time and eliminate labor in controlling expansion and contraction and to be adapted for renewing insulated joints and end posts, pushing or pulling continuous lengths of rail, and for lining crossings and switches.

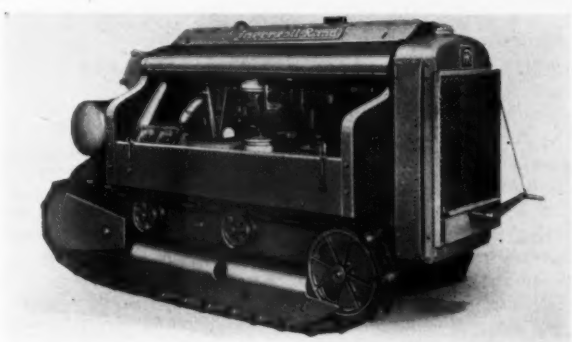
New Compressor Line by Ingersoll-Rand

THE Ingersoll-Rand Company, New York, has announced a new line of Crawl-Air, flanged-wheel mounted and portable air compressors, known as the K-series Mobil-Air compressors, which are said to incorporate a number of refinements and improvements as compared with previous models manufactured by this company. The new features that have been incorporated in these compressors are said to make them particularly suitable for operation under the conditions that are found in railway maintenance of way and bridge and building work.

These new units, it is said, were developed as a result of recognition of the need for making available compressors with a higher degree of efficiency for supplying air for the operation of railway track and bridge and building tools. As an indication of the extent to which this is accomplished by the new compressors, it is said that their use results in a reduction of as much as 40 per cent in average fuel costs as compared with previous models.

One of the outstanding features of the new compressors is the Drill-More Multi-Speed regulator with which they are all equipped. This device is said automatically to adjust the engine speed to the consumption of air and practically to eliminate idling while air is being used. It is claimed that the regulator automatically selects the slowest and most efficient of three working speeds for any given load, and that the unit does not idle and waste gasoline unless the low speed produces more air than is being used. Hence, the average working speed of the compressor and engine is said to be relatively low, thus reducing wear and tear and lengthening the life of the machine.

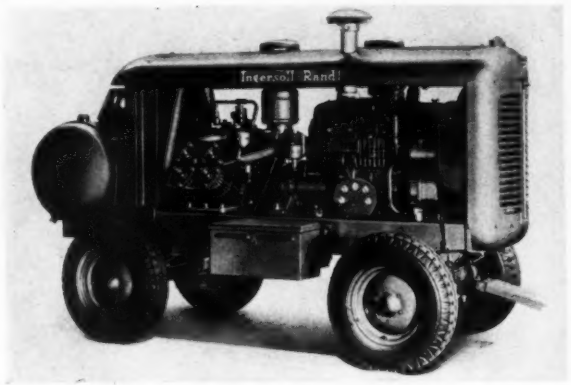
Another feature of the new compressors is that they are driven by Waukesha Multi-Fuel engines which are convertible for operation with either gasoline or oil by making a simple substitution of fuel accessories and without changing heads or pistons. With this feature it is pointed



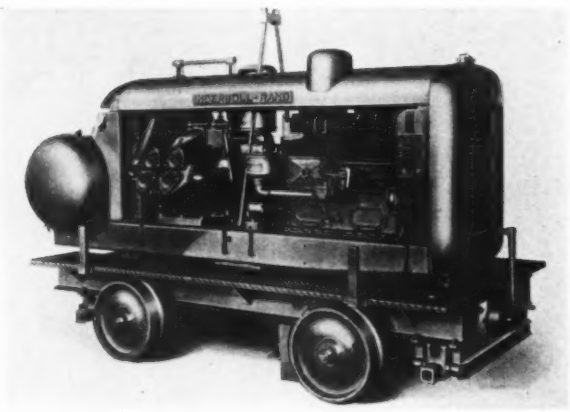
The New Ingersoll-Rand KRC-8 Crawl-Air Compressor

out that a user can convert his unit to take advantage of the most economical fuel in his particular area, and can protect himself against future shortages in any one type of fuel.

When operating on gasoline, it is said that the new engine performs as a high-economy unit and that it employs the same high-turbulence combustion chamber that is used in the Type H (Waukesha-Hesselman) oil engine, long used on Ingersoll-Rand compressors. This feature, it is claimed, results in low fuel consumption, particularly at part loads. On fuel oil, the engine is said to operate with the same part-load economy, and is stated to have the advantage of being easy to start and as simple and as easily understood as the conventional gasoline engine. In addition to those mentioned above, the new units are said to incorporate many other new and improved features, such as a new self-adjusting clutch, which can be refaced without removing the engine or the compressor.



The Model K-210 Portable Compressor With Pneumatic-Tired Wheels

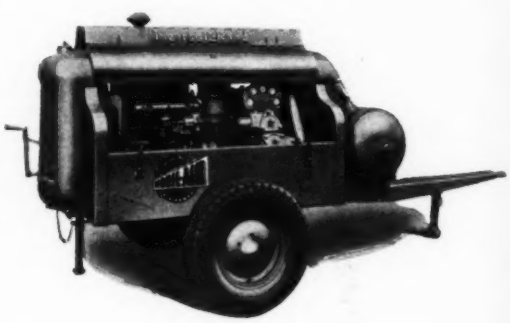


This View Shows the Model KR-210 Track-Mounted Compressor

All the new Crawl-Air, flanged-wheel mounted and portable units are equipped with the Drill-More regulator and the convertible engine with the exception of the 8-tool Crawl-Air unit. Crawl-Air compressors in the new line are available in three sizes, namely, the KRC-8, the KRC-12 and the KRC-16, which are designed for operating 8-tool, 12-tool and 16-tool tie-tamping outfits, respectively. These machines are equipped with the latest type of propelling mechanism for off-track operation along the track shoulder, and it is said that they will all climb grades of as much as 40 per cent and are capable of loading themselves on flat cars under own power.

The new line of flanged-wheel mounted compressors embraces five sizes which are designated as Models KR-105, KR-160, KR-210, KR-315 and KR-500. In each case the capacity of the machine, measured by the number of cubic feet of free air that is delivered per minute, is indicated by the symbol number. These compressors, which are especially adaptable for spike-driving work and bridge and building construction and repair operations, are furnished in both non-self-propelled and self-propelled models, and it is said that the latter machines are capable of attaining speeds up to 20 m.p.h. on level track.

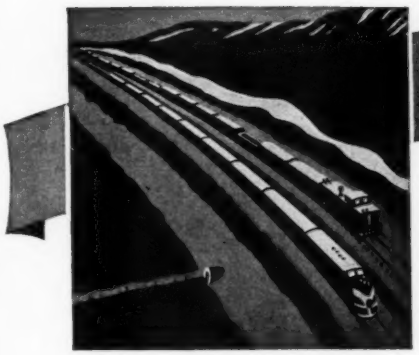
The new portable compressors are also available in five sizes, known as K-105, K-160, K-210, K-315 and K-500. These machines are available with various types of mountings, including steel wheels, pneumatic-tired wheels and skids.



A K-Series Compressor with a Two-Wheel Pneumatic-Tired Trailer Mounting

Comparative tests on actual jack-hammer and paving-breaker jobs are said to have indicated that the saving in gasoline that is effected through the use of the new units amounts to as much as 40 per cent of that required by a new machine of previous models. The extent of this saving depends on the operating load factor, and is attributed to the high-economy engine, the Drill-More regulator, and the use of an entirely new two-stage, air-cooled compressor with improved valving. With the Drill-More regulator it is said that air tools produce up to 15 per cent more work because of the better pressure characteristics maintained by the regulator. It is also stated that these new compressor units weigh up to one-third less than previous models.

Another new Ingersoll-Rand compressor, which was developed especially to meet the needs of users who are interested only in fuel-oil operation, is a unit with a capacity of 315 cu. ft. per min., which is powered by an International Harvester UD-18 full-Diesel engine. This is a portable unit and is designated as the Model IK-315 Mobil-Air compressor. This unit is provided with a special device that is said to permit easy starting on gasoline without the use of high-voltage batteries or a starting engine. The UD-18 is not convertible for operation on gasoline or natural gas.



NEWS of the Month

President's Emergency Powers

The declaration of an unlimited national emergency by President Roosevelt on May 27 seemingly makes available to him certain powers over transportation which are provided for in "time of war or threatened war." Among the powers which are available in "time of war or threatened war" are those embodied in provisions of the Interstate Commerce Act, which stipulate that the Interstate Commerce Commission, upon demand of the President, shall establish priorities for the transportation of troops and shipments of war materials.

President Requests $100,000 for Transport Study Board

On June 4, President Roosevelt transmitted to Congress a request for a $100,000 appropriation "to be immediately available" for the transporation study board called for in the Transportation Act of 1940. This action was taken by the President although he had not yet submitted the name of another nominee to replace Wayne Coy of Indiana, whose name, along with those of of Charles West of Ohio, and Nelson Lee Smith of New Hampshire, was submitted to the Senate on March 20, and subsequently withdrawn on April 29; meanwhile the Senate committee on interstate commerce has indicated no disposition to act on the names of the other two nominees.

Hearings on St. Lawrence Seaway

Hearings before the House committee on rivers and harbors on the bill to authorize President Roosevelt to carry out the United States-Canadian agreement with respect to the St. Lawrence power and seaway project got under way on June 17 with the testimony of Secretary of War, Henry L. Stimson, followed on June 18 by the testimony of Secretary of the Navy, Frank Knox.

Secretary Stimson did not go so far as to say that the project was "essential" to national defense, but he did insist that it would be a "very valuable" work in the interest of national defense, particularly the hydro-electric power phase. And, although he thinks work on the project should go forward now, Mr. Stimson would not give it priority over the manufacture of a number of important munitions. He added that the question of such priority was not apt to arise in view of the fact that materials required for the seaway would not be similar to those required for defense needs.

Secretary Knox told the committee that he felt the project to be "important but not vital to national defense." He also declared that its completion would answer the country's future needs rather than its present ones.

Other Unions Also Demand Pay Increases

On June 10, the 14 non-operating railroad unions, not to be outdone by the Big Five operating brotherhoods, who had previously announced their intention of asking for a 30 per cent increase in basic rates of pay, as reported in the June issue, presented formal demands which involve an average increase of approximately 47 per cent. The average increase demanded by the 19 railway unions (including the operating brotherhoods) is about 41 per cent.

The railroads in Eastern and Western territories, anticipating this demand, served formal notice on June 7 of their intent to revise existing agreements governing rules and work conditions to eliminate "feather bed" rules, requiring pay for work not done. Meanwhile, National Mediation Board meetings are still being held on the earlier demand of the non-operating unions for vacations with pay.

An interesting feature of the formal demands received on June 10 is that they agree unanimously that the claims for increases, "if they cannot be settled on individual railways," be heard on a national rather than a regional basis. It may be noted, in passing, that the demands of the transportation unions alone, on the basis of current employment, represents a total annual increase in wages of approximately $190,000,000, which, coincidentally or otherwise, may be compared with the net income of the carriers last year, which was $191,000,000.

After receipt of the demands on June 10, C. E. Johnston, chairman of the Western Association of Railway Executives, outlined what they would mean, if granted.

"The unions representing non-operating railway employees have served demands for a wage increase of 30 cents an hour," he said, "and for a minimum hourly wage of 70 cents. The present minimum wage in the railroad industry, made effective only last March by the federal government under the Fair Labor Standards Act, is 36 cents per hour. For those men now receiving this minimum, a pay increase of 95 per cent is being sought; for the men now receiving 40 cents an hour, the increase sought is 75 per cent; for the men now receiving 50 cents an hour, the increase sought is 60 per cent; and for the men now receiving 60 cents an hour, the increase sought is 50 per cent. Over the entire non-operating group the wage increase demanded exceeds 47 per cent, equivalent, under present conditions, to an annual total of approximately $580,000,000.

"In other words, the employees today have asked the railroads for wage increases averaging more than 41 per cent and amounting, in the aggregate, to some $770,000,000 a year."

Steel for Freight Cars Gets High Priority Rating

On June 10, Leon Henderson, administrator of the office of Price Administration and Civilian Supply, announced a "civilian allocation program," giving materials necessary for the construction and repair of freight cars preference, after government contracts, over material and equipment going into any "other civilian" use. This announcement was followed on June 19 by an order of E. R. Stettinius, Jr., director of priorities of the Office of Production Management, granting 60 car builders a limited blanket priorities rating of A-3.

In his announcement, Mr. Henderson stated that the move was made "to meet the impending shortage in railroad freight cars"; and his program provides that "all deliveries of equipment necessary for the construction and repair of freight cars shall be given preference over all material and equipment going into any other civilian use, subject only to a prior preference on deliveries for all such material and equipment as may be required under contracts with the United States or any department or agency thereof."

The OPACS administrator added, "the railroads are now undertaking to expand their supply of rolling stock. They had approximately 73,000 cars on order May 1, which should be built this year. In order to accomplish this and to avoid a serious rail transportation bottleneck it is essential that the construction of these freight cars and the repair of bad order cars be speeded by every means possible."

In a letter to the car builders (which includes railroads that build their own cars) concerning the preference rating granted, Mr. Stettinius said, "You will employ extreme care in making use of this privilege and the extension of the same to your suppliers, and you will emphasize proper scheduling in the ordering of necessary material." The letter also urged the car builders to substitute non-scarce materials for critical items wherever possible.

Personal Mention

General

H. T. Reinicker, whose retirement as assistant superintendent of the Shenandoah division of the Norfolk & Western, with headquarters at Roanoke, Va., was reported in the June issue, entered service with the N. & W. on April 27, 1891, as a supervisor's clerk on the Radford division. Four years later he was made maintenance of way clerk, and in 1899 he was promoted to assistant roadmaster of the Radford division. In 1903, Mr. Reinicker was further promoted to roadmaster, in which capacity he served on the Scioto, Radford and Shenandoah divisions. On February 1, 1915, he was promoted to assistant superintendent of the Scioto division, being transferred to the Norfolk division on November 1, 1923, where he remained until his retirement.

Colonel L. L. Morton, assistant general manager of the Louisville & Nashville, has been promoted to assistant vice-president and assistant general manager in charge of engineering and roadway, and also director of personnel, with headquarters as before at Louisville, Ky. Colonel Morton was born at Mt. Eden, Ky., on April 2, 1884, and graduated in civil engineering from Centre College in 1905. He entered railway service in June, 1906, in the engineering department of the Atlanta, Birmingham & Atlantic (now the Atlanta, Birmingham & Coast). He left this road in 1909, to become an assistant engineer on the Kansas City Southern at Texarkana, Tex., and in 1912 he accepted a similar position in the office of the chief engineer of the Louisville & Nashville. During the World War, Col. Morton served successively in the United States Army as captain, major and lieutenant-colonel of engineers. He returned to the service of the L. & N. in 1919, and in 1920 he was made a special engineer at Louisville, Ky. Eight years later, he was promoted to superintendent of the New Orleans and Mobile division, with headquarters at New Orleans, La., and in June, 1931, when this division was combined with the Montgomery division, under the name of the Montgomery and New Orleans division, he was appointed superintendent of the new division, with headquarters at Mobile. On October 15, 1931, Col. Morton was advanced to assistant general manager, with headquarters at Louisville, Ky., the position he held until his recent promotion.

Donald J. Russell, superintendent of the Los Angeles division of the Southern Pacific, with headquarters at Los Angeles, Cal., and an engineer by training and experience, has been promoted, effective July 1, to assistant to the president, with headquarters at San Francisco, Cal. Mr. Russell was born at Denver, Colo., on January 3, 1900, and attended St. Mary's College, Oakland, Cal., and Stanford University. He entered railway service in 1920 as an assistant foreman of an extra gang on the Sacramento division of the Southern Pacific, and later became a section foreman, instrumentman and assistant engineer in the maintenance of way department and on construction work. In 1927 he was appointed roadmaster on the Portland division, with headquarters at Oakridge, Ore., and in 1928 he was promoted to assistant trainmaster. A year later Mr. Russell was advanced to trainmaster, and in August, 1934, he was promoted to assistant superintendent of the Portland division, with headquarters at Portland. In September, 1937, he was advanced to assistant to the general manager, with headquarters at San Francisco, and on July 1, 1939, he was promoted to superintendent of the Los Angeles division, with headquarters at Los Angeles, which position he held until his recent promotion.

Donald J. Russell

George A. Kirley, whose appointment as general manager of the Boston & Albany at Boston, Mass., was reported in the June issue, was born on August 31, 1880, at Fairfield, Vt., and received the degree of bachelor of science in civil engineering from the University of Michigan in 1907. He entered railroad service on July 15, 1907, as draftsman in the signal department of the New York Central at New York, serving in this capacity until May 1, 1908. On May 15, 1909, he became draftsman in the signal department of the Boston & Albany, becoming chief draftsman in February, 1912. Mr. Kirley became assistant engineer in the signal department on May 1, 1915, and on April 1, 1918, was appointed signal engineer. He was promoted to chief engineer on January 1, 1927, the position he held until his recent appointment as general manager.

Kaiden-Keystone

George A. Kirley

J. W. Knapp, Jr., whose promotion to trainmaster on the Chesapeake & Ohio, with headquarters at Richmond, Va., was reported in the June issue, was born on April 4, 1900, at Griffin, Ga., and attended Virginia Military Institute, from which he graduated in 1921. He entered the service of the Chesapeake & Ohio on October 20, 1923, as a rodman in the engineering department at Richmond, being promoted to instrumentman a month later. On June 10, 1925, he was advanced to assistant cost engineer in the maintenance of way department and on April 16, 1927, he was further promoted to assistant division engineer. Mr. Knapp was appointed supervisor of track on January 1, 1929, and on July 8 of that year he again became an assistant division engineer, with headquarters at Russell, Ky. In 1936, he was promoted to division engineer of the Richmond division, which position he held until his recent appointment as trainmaster.

Christian S. Collier, whose promotion to trainmaster on the Illinois Central, with headquarters at Princeton, Ky., was reported in the June issue, was born at Peoria, Ill., on December 2, 1892, and attended Bradley College, Peoria. He entered railway service on August 1, 1917, as a chainman on the Illinois Central at Chicago. In the following year he was promoted to rodman, and in 1920 he was made an instrumentman in the maintenance department on the Illinois division, with headquarters at Champaign, Ill. In 1923, he was transferred to the construction department as an instrumentman on track elevation work at Champaign, being promoted to assistant engineer in the construction department, with headquarters at Chicago, in 1924. Five years later Mr. Collier returned to the maintenance of way department, serving as an instrumentman and rodman on the Springfield division until September, 1937, when he was promoted to supervisor of track at Clinton, Ill. In February, 1939, he was advanced to supervisor of trains and track, with headquarters at Princeton, the position he held until his recent promotion.

Engineering

W. Jay Foster, engineer of grade crossings of the Erie, with headquarters at Cleveland, Ohio, retired on June 1 after 48 years service with that road.

Samuel R. Hursh, acting chief engineer maintenance of way of the Eastern region of the Pennsylvania, has been appointed chief engineer of maintenance of way of the Eastern region.

Charles H. Hitchcock, engineer grade crossings of the Reading Company, with headquarters at Philadelphia, Pa., will retire on June 30, after more than 49 years of service with this company.

L. G. Walker, supervisor of track on the Pennsylvania at Harrisburg, Pa., has been appointed assistant division engineer on the Ft. Wayne division, with headquarters at Ft. Wayne, Ind., succeeding **T. E.**

Boyle, who has been promoted to division engineer, with headquarters at Pittsburgh, Pa., succeeding **G. A. Williams.** Mr. Williams has been transferred to Chicago, replacing **L. E. Gingerich,** whose promotion to division engineer in the office of the chief engineer at Philadelphia, Pa., was reported in the June issue.

Wellesley T. Richards has been appointed chief engineer of the Sacramento Northern, with headquarters at Sacramento, Cal., succeeding **Herman O. Brown.**

L. V. Chausse has been re-appointed division engineer of the Idaho division of the Union Pacific, with headquarters at Pocatello, Idaho, succeeding **T. L. Pidcock.**

Russell L. Cook, office engineer in the engineering department of the Central of Georgia, with headquarters at Savannah, Ga., has been promoted to assistant chief engineer.

O. M. Barlow, assistant division engineer on the Southern Pacific at Oakland Pier, Cal., has been promoted to division engineer of the Western division, with the same headquarters, succeeding **F. A. Bordwell,** who retired on July 1.

W. H. Freeman, rodman in the party of the engineer of surveys of the Chicago Great Western, has been promoted to assistant division engineer, with headquarters at Oelwein, Iowa, succeeding **John Ireland,** who has been called for military service.

Henry Clay Cosand, whose promotion to engineer of capital expenditures of the Denver & Rio Grande Western, with headquarters at Denver, Colo., was announced in the May issue, was born at New Castle, Ind., on September 7, 1877, and studied civil engineering at Purdue University from 1901 to 1904. In April, 1904, he entered railway service as a rodman on the Chicago, Rock Island & Pacific at Topeka, Kan., later serving as a draftsman, inspector and assistant engineer on the construction of Armourdale yard, Kansas City, Kan., and Carrie Avenue yard at St.

Henry Clay Cosand

Louis, Mo. In 1911, he was promoted to office engineer at Topeka and in 1915 he was appointed pilot engineer. Mr. Cosand was promoted to division engineer at Eldon, Mo., in 1916, and in April, 1917, he went with the D. & R. G. W. as office engineer, later serving as computing engineer and assistant engineer. In October, 1923, he was appointed division engineer at Grand Junction, Colo., later being transferred to Salt Lake City. His promotion to engineer of capital expenditures was effective April 1.

Charles H. Mottier, assistant to the vice-president and chief engineer of the Illinois Central, has been promoted, effective July 1, to chief engineer, with headquarters as before at Chicago, and **Fred L. Thompson,** vice-president and chief engineer, will continue as vice-president in charge of the engineering department. Mr. Mottier was born at Gibson City, Ill., on April 21, 1888, and graduated in civil engineering from the University of Illinois in 1910. He entered railway service in 1910 as an instrumentman and inspector on track elevation work for the Chicago, Burlington & Quincy in Chicago, and in February, 1911, went with the Illinois Central on construction work in the bridge department, serving successively as masonry inspector, construction foreman, draftsman, designer and assistant

Charles H. Mottier

engineer. In 1918 he was transferred to the office of the chief engineer at Chicago as an assistant engineer, later being promoted to office engineer. In 1920, Mr. Mottier was appointed office engineer of the Chicago Terminal Improvements of the Illinois Central, and in 1924 he was appointed engineer of design, with headquarters as before at Chicago. In 1935 he was promoted to assistant to the vice-president and chief engineer. Mr. Mottier has been an active member of the American Railway Engineering Association for many years, having served as a member of the Committee on Yards and Terminals since 1922, and at present is serving his second year as chairman of that committee.

Luis G. Morphy, whose appointment, effective June 1, as district engineer on the New York Central in Boston & Albany territory, with headquarters at Boston, Mass., was reported in the June issue, was born on December 4, 1876, at Orizaba, Vera Cruz, Mexico, and was educated by private tutors and in the public schools of Mexico. He received his bachelor of science degree from Spring Hill College, Mobile, Ala., in 1897 and also attended Rensselaer Polytechnic Institute, Troy, N.Y. Mr. Morphy entered railway service in 1900 as transitman with the New York Central, serving succes-

Luis G. Morphy

sively as supervisor of track, assistant engineer, resident engineer and assistant to principal assistant engineer. In 1917 Mr. Morphy became assistant engineer maintenance of way and construction of the Boston & Albany, then serving as assistant to chief engineer, designing and division engineer and principal assistant engineer, consecutively. In 1920 he became manager in South America of the Foundation Company of New York. From 1921 to 1926 he served as chief engineer of the Rutland, becoming general superintendent and chief engineer in 1926. On December 15, 1937, Mr. Morphy was appointed general manager and chief engineer, the positions he held until his appointment as receiver of the road in July, 1938.

Arthur O. Ridgway, whose retirement on May 1 as chief engineer of the Denver & Rio Grande Western, was announced in the May issue, has been appointed engineering consultant to the trustees, with headquarters as before at Denver, Colo.

Charles H. Gaylord, instrumentman on the Chicago, Rock Island & Pacific at Des Moines, Iowa, has been promoted to acting division engineer of the Southern division, with headquarters at Ft. Worth, Tex., succeeding **Arthur C. Bradley,** who has been granted a leave of absence to engage in military service.

Lee Thomas Taylor, whose promotion to division engineer on the Gulf, Colorado & Santa Fe, with headquarters at Galveston, Tex., was reported in the May issue, was born at Springfield, Tenn., and entered railway service in 1913 as a rodman on the G. C. & S. F., later serving continuously in various capacities in the engineering department of that road, except for a brief period of service in the U. S. Army during the first World War, until February, 1936, when he was promoted to roadmaster at Brownwood, Tex., which position he held until his recent promotion.

Paul Crowe, general foreman on the Erie at Hammond, Ind., whose appointment as assistant division engineer at Buffalo, N. Y., was announced in the May

issue, was born on October 21, 1898, at Lafayette, Ind. Mr. Crowe attended Purdue university, graduating in 1922, with a degree in civil engineering. In July of the same year he entered the service of the Erie as a levelman at Youngstown, Ohio, becoming a transitman at the same point in 1926. Two years later he became chief of corps at Youngstown, later holding this position successively at Hornell, N. Y., and Jersey City, N. J. He was promoted to general foreman at Hammond in 1939, remaining in that capacity until his recent appointment as assistant division engineer.

Earl G. Brisbin, whose promotion to assistant division engineer on the New York Central (Michigan Central) at Bay City, Mich., was reported in the April issue, was born at Adrian, Mich., on May 5, 1898, and attended Michigan Normal school. He entered railway service on October 16, 1916, as a rodman-clerk on the Michigan Central at Jackson, Mich., later being transferred to Bay City. In October, 1918, he was promoted to instrumentman at Niles, Mich., and in 1920 he was transferred to Jackson. Mr. Brisbin later served as a draftsman and assistant engineer at Jackson and on December 1, 1936, he was promoted to roadmaster, with headquarters at Jackson. His title was later changed to supervisor of track, the position he held until his recent promotion, effective March 1.

Schuyler M. Smith, whose appointment as bridge engineer of the Gulf, Mobile & Ohio, with headquarters at Mobile, Ala., was reported in the May issue, was born at Manchester, Mich., on April 21, 1888, and graduated from Armour Institute of Technology in 1911. He first entered railway service during a summer vacation as a rodman on construction for the Chicago, Milwaukee, St. Paul & Pacific in South Dakota, and the following summer worked for the Chicago & North Western as a rodman on construction in Wisconsin. After graduation he returned to the North Western as an instrumentman at Pekin, Ill. Shortly thereafter he was connected with the Isthmian Canal Commission and

Schuyler M. Smith

in 1913 he was appointed assistant engineer on the Wabash. From 1917 to 1919 he served as a captain in the engineer corps of the United States Army. He re-entered railway service in 1919 with the Wabash when he was appointed principal assistant engineer, with headquarters at St. Louis. In 1922 he left railway work to enter the service of the American Bridge Company, where he remained until 1924 when he returned to the Wabash in the bridge engineer's department, serving successively as resident engineer, assistant bridge engineer and special engineer. On June 1, 1931, Mr. Smith was appointed bridge engineer of the Missouri-Kansas-Texas and two years later, he left railroad service to become bridge engineer of St. Louis County, Mo. In 1934 he returned to the Wabash as engineer of design and in 1938 he went with the Mobile & Ohio as resident engineer on bridge strengthening work and the construction of a fruit terminal at Mobile. When the Gulf, Mobile & Northern and the Mobile & Ohio were consolidated to form the Gulf, Mobile & Ohio, Mr. Smith became associated with the latter road.

Benjamin Elkind, whose appointment as office engineer of the Erie, with headquarters at Cleveland, Ohio, was announced in the June issue, attended New York University and entered rail-

Benjamin Elkind

way service in 1912 as student foreman of a section gang. His service with the Erie has been continuous since that time, with the exception of two years, one year overseas as a first lieutenant with the 49th Engineers and 78th Transportation Corps and the other year engaging in contract work. In 1916 he was appointed assistant engineer, after which he held successively the positions of resident engineer, track supervisor, engineering accountant, estimating engineer and chief draftsman.

Anthony Francis Dorley, principal assistant engineer on the Missouri Pacific, with headquarters at St. Louis, Mo., has retired. Mr. Dorley was born at Lancaster, Pa., on April 8, 1875, and graduated from Mt. St. Mary's College, Emmitsburg, Md., in 1893, and the School of Engineering, Notre Dame University, in 1900. He entered railway service on June 20, 1900, as a rodman on the Baltimore & Ohio Southwestern (now the B. & O.) and in January, 1901, he went with the Cleveland, Cincinnati, Chicago & St. Louis (Big Four) as an assistant engineer, later returning to the B. & O. Southwestern as an assistant engineer. In April, 1903, he was promoted to assistant division engineer at Washington, Ind., and on April 2, 1906, he went with the Missouri Pacific as an assistant engineer. Mr. Dorley was promoted to division engineer at Kansas

Anthony Francis Dorley

City, Mo., three months later and then was transferred successively to Omaha, Neb., Osawatomie, Kan., and back to Kansas City. In December, 1910, he was promoted to engineer of water service, with headquarters at St. Louis, and in October, 1913, he was advanced to principal assistant engineer. In June, 1915, he was appointed engineer maintenance of way of the Eastern district, with headquarters as before at St. Louis, and in July, 1926, when the positions of district engineers of maintenance of way were abolished, he was re-appointed principal assistant engineer, his duties being related to new railroad construction, improvement projects and highway crossing matters. Mr. Dorley has been an active member of the American Railway Engineering Association for many years, and served as chairman of the committee on Water Service from 1915 to 1925.

W. F. Petteys, assistant division engineer on the Erie at Buffalo, N. Y., whose promotion to division engineer at Dunmore, Pa., was noted in the May issue, was born on February 7, 1902, at Depew, N. Y. Mr. Petteys received his higher education at Rensselaer Polytechnic Institute, from which he was graduated in 1925. He entered railway service on May 2, 1926, as a temporary transitman on the Buffalo division of the Erie, with headquarters at Buffalo, and on November 1 of that year he was advanced to transitman. On April 15, 1928, Mr. Petteys was promoted to chief of corps on the same division, and on March 15, 1932, he was transferred to the Wyoming division, with headquarters at Scranton, Pa. He was promoted to maintenance inspector at Dunmore on November 1, 1932, and two years later he was appointed general yard foreman at Susquehanna, Pa. On February 11, 1936, Mr. Petteys was transferred to the New York division, with headquarters at Port Jervis, N. Y., and in 1936, he was promoted to assistant division engineer, which position he held until his recent appointment as division engineer.

Jesse G. Gilley, assistant division engineer of the Ashland division of the Chesapeake & Ohio, with headquarters at Ash-

land, Ky., has been promoted to division engineer of the Richmond division, with headquarters at Richmond, Va., effective May 1, to succeed **J. W. Knapp, Jr.**, whose promotion to trainmaster is noted elsewhere in these columns. **J. A. Bragg,** supervisor of track, with headquarters at Cane Fork, W. Va., has been promoted to assistant division engineer of the Ashland division, with headquarters at Ashland, Ky., to succeed Mr. Gilley.

Mr. Gilley was born on July 23, 1896, at Ashland and after a university education he entered the service of the Chesapeake & Ohio in 1913 as a check and yard clerk at Russell, Ky. While attending college, Mr. Gilley served as a clerk on the C. & O. during the summer vacation periods of 1916 and 1917. During the World War he served in the United States Army, and afterwards he worked as an engineer for a private engineering concern and as a valuation engineer for the United States government. In 1927, he returned to the C. & O. as an assistant engineer at Ashland, being promoted to supervisor of track on the Ashland division on December 6, 1929. On January 18, 1941, he was appointed assistant division engineer of the same division, which position he held until his recent promotion to division engineer at Richmond.

Edwin Trimble Lytle, whose promotion to district engineer on the Missouri-Kansas-Texas of Texas, with headquarters at Denison, Tex., was reported in the

Edwin Trimble Lytle

May issue, was born at Lytle, Tex., on October 27, 1888, and attended the University of Texas in 1908 and 1909. He entered railway service on December 21, 1915, as an instrumentman on the Katy at Denison, later being transferred to Dallas, Tex., and Smithville. From May 9, 1918, to February 14, 1919, he served in the 45th Field Artillery of the U. S. army, returning to the Katy on the latter date as an instrumentman at Dallas. On November 16, 1926, Mr. Lytle was promoted to roadmaster, with headquarters at Denison, and on June 16, 1929, he was transferred to the Ft. Worth and South Dallas divisions, with headquarters at Ft. Worth, Tex., the position he held until his recent promotion.

J. M. Davidson, assistant superintendent on the Canadian National at Portage la Prairie, Man., and an engineer by training and experience, retired on May 4. Mr. Davidson was born at Glasgow, Scotland, on June 4, 1877, and entered railway service in September, 1905, as a chainman on the location and construction of part of the present Canadian National system in Manitoba. He later served as resident engineer on construction in Alberta, Saskatchewan and British Columbia, and in April, 1916, he was appointed assistant engineer at Winnipeg, Man., later serving as resident engineer and division engineer at that point. Mr. Davidson was promoted to assistant superintendent at Portage la Prairie on July 1, 1927, which position he held until his retirement.

Track

J. D. Sullens, a section foreman on the Birmingham division of the Southern, has been promoted to assistant to the roadmaster, with headquarters at Somerset, Ky., succeeding **J. G. Beard.**

George M. Brum, a track supervisor on the Southern division of the Chicago, Rock Island & Pacific, has been promoted to roadmaster, with headquarters at Sibley, Iowa, succeeding **John R. Perkins,** who retired on June 1.

P. J. Melody, a track supervisor on the Ottumwa division of the Chicago, Burlington & Quincy, has been promoted to roadmaster on the Centerville division, with headquarters at Milan, Mo., succeeding **M. C. Van Velkinburgh,** who retired on July 1.

H. C. Kohout, assistant on the engineer corps of the Central region of the Pennsylvania, has been promoted to assistant supervisor of track on the Chicago Terminal division at Colehour, Ill., succeeding **L. W. Hogston,** who has been transferred to Altoona, Pa.

J. V. Slaughter, assistant roadmaster on the Southern Pacific Lines in Texas & Louisiana, at Houston, Tex., has been promoted to roadmaster at that point, succeeding **H. L. Pruett,** who has been transferred to San Antonio, Tex. Mr. Pruett replaces **W. A. Enderle,** who retired on May 31.

E. T. Lea, a project engineer on construction for the Mississippi State Highway Department, has been appointed roadmaster of the Columbus & Greenville, with headquarters at Columbus, Miss. **N. J. Law, Jr.,** supervisor of track, bridges and buildings, has resigned to become assistant engineer of the Terminal Railroad Association of St. Louis, as announced elsewhere in these columns.

N. J. Law, Jr., a supervisor of track, bridges and buildings of the Columbus & Greenville, with headquarters at Columbus, Miss., has resigned to go with the Terminal Railroad Association of St. Louis, as assistant engineer, with headquarters at St. Louis, Mo., and **Lloyd T. Casson,** formerly with the U. S. Engineer Corps in the Mobile district, has been appointed resident engineer of the T.R.R.A. at St. Louis.

Raymond C. Hager, assistant supervisor of track on the New York Central at Kentland, Ind., has been promoted to supervisor of track, with headquarters at Kankakee, Ill., succeeding **R. R. Rex.,** who has been appointed supervisor of track on the Indiana Harbor Belt, with headquarters at Hammond, Ind., relieving **C. T. Kimbrough,** who has retired. **Lloyd C. James,** section foreman on the New York Central at Morocco, Ind., has been promoted to assistant supervisor of track at Kentland, replacing Mr. Hager.

W. R. Garrett, acting roadmaster on the Kansas City Terminal and the St. Joseph division of the Chicago, Burlington & Quincy, at Kansas City, Mo., has been promoted to roadmaster on the Hannibal division, with headquarters at Hannibal, Mo., succeeding **G. L. Griggs,** who has been transferred to the Ottumwa division, with headquarters at Ottumwa, Iowa, relieving **J. A. Lowry,** who retired on July 1. **J. L. Foley,** a track supervisor on the St. Joseph division, has been promoted to succeed Mr. Garrett at Kansas City.

D. E. Fuller, assistant supervisor of track of Subdivision 13 of the Buffalo division of the New York Central, with headquarters at Buffalo, N.Y., has been promoted to supervisor of track of Subdivision 31 of the St. Lawrence division, with headquarters at Remsen, N.Y. Mr. Fuller succeeds **P. B. Garrison,** who has been transferred to Subdivision 22 of the Mohawk division, with headquarters at Selkirk, N.Y., where he succeeds **D. L. Robertson,** who has been granted a leave of absence because of illness. **H. W. Lind,** a draftsman in the office of the engineer maintenance of way, Lines East, at New York, has been promoted to assistant supervisor of track at Buffalo, to succeed Mr. Fuller.

Jack William Buford, whose promotion to supervisor of track on the Pennsylvania, with headquarters at Akron, Ohio, was announced in the April issue, was born at Topeka, Kan., on July 22, 1912, and attended the University of Washington in 1933 and Harvard University in 1934. He entered railway service on August 16, 1934, as an assistant on the engineering corps of the Pennsylvania at Cincinnati, Ohio, later being transferred successively to Columbus, Ohio, and Chicago, Ill. On March 10, 1937, he was promoted to assistant supervisor of track at Columbia, Pa., and on May 1, 1938, was transferred to Harrisburg, Pa. Mr. Buford was transferred to the Maryland division, with headquarters at Washington, D.C., on February 24, 1939, where he was located until his recent promotion.

J. E. Smith, assistant supervisor of track of Subdivision 2 of the Electric division of the New York Central, with headquarters at Harmon, N.Y., has been promoted to supervisor of track of Subdivision 30 of the Buffalo division, with headquarters at Rochester, N.Y., succeeding **W. G. Cowie,** who has been transferred to Subdivision 11 on the Syracuse division, with the same headquarters. Mr. Cowie succeeds **J. J. O'Neil,** who retired, effective May 31. **E. B. Francis,** a rodman on the engineer corps of the Pennsylvania division, with headquarters at Jersey Shore, Pa., has been promoted to assistant supervisor of track of Subdivision 20 of the River division, with headquarters at Newburgh, N.Y., to replace **C. J. Randall,** who has been transferred to Harmon, succeeding Mr. Smith.

Burman Johnson, whose appointment as track supervisor on the Chesapeake & Ohio, with headquarters at Peach Creek, W. Va., was announced in the April issue, was born on May 2, 1899, at Salt Rock, W. Va. He entered railway service on January 6, 1916, as a track laborer on the C. & O. On May 22, 1927, he was promoted to section foreman, which position he held until May 2, 1935, when he became an extra gang foreman. Mr. Johnson was holding the latter position at the time of his recent promotion to track supervisor, which became effective on March 3.

Lonnie Allen Walls, whose promotion to track supervisor on the Nashville, Chattanooga & St. Louis, with headquarters at Dickson, Tenn., was announced in the April issue, was born at Wartrace, Tenn., on March 18, 1898, and entered railway service in July, 1914, as a section laborer at Rucker, Tenn. In 1916 he was appointed station agent at Rucker and the following year he was appointed assistant extra gang foreman on the Atlanta division. On January 1, 1925, Mr. Walls was promoted to section foreman on the Atlanta division and served in that capacity and as an extra gang foreman at various points until his recent promotion to track supervisor.

George LeRoy Condie, whose promotion to roadmaster on the Union Pacific, with headquarters at Cache Junction, Utah, was announced in the April issue, was born at Salt Lake City, Utah, on January 13, 1902, and entered railway service on April 7, 1925, as a sectionman at Downey, Idaho. On August 16, 1926, he was promoted to section foreman and served in that capacity and as an extra gang foreman at various points in Idaho and Wyoming. On August 1, 1940, Mr. Condie was promoted to steel gang foreman at Weiser, Idaho, and on December 6, 1940, he was advanced to assistant roadmaster at Ontario, Ore., the position he held until his recent promotion.

Julius E. Nitzschke, whose promotion to track supervisor on the Southern, with headquarters at Huntingburg, Ind., was announced in the May issue, was born at Danville, Ky., on March 31, 1915, and attended the University of Cincinnati from 1933 to 1936 and the University of Kentucky from 1936 to 1938. He entered railway service in June, 1938, as a student apprentice on the Southern, and in September, 1940, was promoted to assistant supervisor of bridges and buildings at Louisville, Ky. On February 1, 1941, Mr. Nitzschke was appointed assistant to the roadmaster at Somerset, Ky., the position he held until his recent promotion.

Hiram A. Mercer, whose retirement as track supervisor on the Illinois Central at Yazoo City, Miss., on May 1, was reported in the May issue, was born near Lexington, Miss., on January 7, 1878, and entered railway service in May, 1898, as an extra gang laborer at Eden, Miss. A year later he was promoted to assistant foreman and later to section foreman. In May, 1901, he was advanced to extra gang foreman at Anding, Miss., and continued as an extra gang and section foreman until September 1, 1917, when he was promoted to track supervisor on the Canton district, with headquarters at Jackson, Miss. Mr. Mercer was later transferred to Yazoo City, where he was located until his retirement.

William A. Carlson, whose promotion to track supervisor on the Pere Marquette, with headquarters at Edmore, Mich., was reported in the May issue, was born at Heron Lake, Minn., on March 17, 1898, and entered railway service on December 29, 1929, as a section laborer on the Pere Marquette. On December 17, 1932, he was appointed temporary section foreman at Plymouth, Mich., and on May 5, 1933, was promoted to regular section foreman at Fowlerville, Mich., later being transferred to Williamston, Mich. During the summer of 1937, Mr. Carlson served as assistant supervisor of track at Grand Ledge, Mich., and then served intermittently as a section foreman or inspector on special work, until his recent promotion.

John E. Reese, whose promotion to supervisor of track on the Reading, with headquarters at Gordon, Pa., was reported in the May issue, was born on December 3, 1908, at Tamaqua, and was educated at Gettysburg college and the University of Michigan. He entered the service of the Reading on October 6, 1936, as assistant supervisor of track on the Shamokin division, with headquarters at Tamaqua. In February, 1939, he was transferred to the Philadelphia division, with headquarters at Philadelphia, where he was located at the time of his recent promotion to supervisor of track at Gordon.

Henry P. Lessler, whose promotion to roadmaster on the Denver & Rio Grande Western, with headquarters at Walsenburg, Colo., was announced in the May issue, was born in Chicago on May 30, 1908, and graduated in civil engineering from the University of Illinois in 1934. He entered railway service in September, 1934, as a rodman on the Chicago, Milwaukee, St. Paul & Pacific at Aberdeen, S. D., and three years later, was transferred to Mason City, Iowa. In April, 1938, he went with the Iowa State Highway Commission as chief of a party and a year later he returned to railroad service in the engineering department of the Chicago, Burlington & Quincy at La Crosse, Wis. In October, 1939, Mr. Lessler went with the D. & R. G. W. as office engineer at Pueblo, the position he held until his recent promotion.

Bridge and Building

Edwin C. Neville, bridge and building master on the Canadian National, with headquarters at Toronto, Ont., retired on June 13.

L. W. Ashton has been re-appointed supervisor of bridges and buildings on the Union Pacific at Nampa, Idaho, succeeding **G. A. Meier.**

N. R. Tucker, whose promotion to supervisor of bridges and buildings on the Southern Pacific Lines in Texas and Louisiana, with headquarters at Lafayette, La., was announced in the April issue, was born at Ponchatoula, La., on August 24, 1898, and attended Louisiana State University. He entered the service of the Southern Pacific in 1923 as a rodman, being promoted subsequently to levelman and instrumentman. In November, 1936, he was advanced to assistant supervisor of bridges and buildings at Lafayette.

H. B. McColgan, whose promotion to supervisor of bridges and buildings of the Radford division of the Norfolk & Western, with headquarters at Roanoke, Va., was announced in the June issue, served during his early years of service with the N. & W. in the engineering department as a rodman, inspector, levelman, chainman and transitman. In November, 1936, he was promoted to assistant roadmaster of the Norfolk division and in May of the following year he was transferred to the Scioto division. In September, 1938, he was promoted to roadmaster at Wilcoe, W. Va., and after two months in this position he was made assistant supervisor of bridges and buildings of the Scioto division at Portsmouth, where he remained until his recent appointment as supervisor of bridges and buildings of the Radford division.

A. E. Reynolds, whose promotion to master carpenter of the Ottumwa-Creston divisions of the Chicago, Burlington & Quincy, with headquarters at Burlington, Iowa, was reported in the June issue, was born at New Market, Iowa, on February 4, 1899, and entered railway service on August 1, 1919, as a section laborer on the Centerville division of the Burlington at New Market. Two years later he transferred as a helper to the system steel bridge gang, which at that time was working on the Centerville division, and continued with that gang, being promoted to carpenter on September 1, 1922. On July 1, 1928, he was advanced to foreman of the gang, the position he held until his recent promotion.

C. Landstrom, whose retirement on May 1 as master carpenter of the Ottumwa-Creston divisions of the Chicago, Burlington & Quincy, with headquarters at Burlington, Iowa, was reported in the June issue, was born in Sweden and entered railway service on August 12, 1891, as a section laborer on the Burlington at Russell, Iowa. A month later he transferred to the bridge and building department as a helper at Ottumwa, Iowa. From May 23, 1894, to June 3, 1896, he was laid off because of force reduction, and on the latter date returned to service as a carpenter on the Hannibal division. He later became a carpenter on the system steel bridge gang and in March, 1904, he was promoted to foreman of the division bridge gang at Osceola, Iowa. Mr. Landstrom was later transferred to Mt. Pleasant, Iowa, and Ottumwa, and on July 1, 1916, he was advanced to master carpenter of the Burlington division with headquarters at Burlington, Iowa. Later the Burlington division was abolished and he was appointed assistant master carpenter of the Ottumwa division. On January 1, 1924, he was promoted to master carpenter of the Ottumwa division, with headquarters at Burlington, Iowa, and in 1931, his territory was extended to include the Creston division.

Dale U. Bond, whose promotion to master carpenter on the Chicago, Rock Island

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& Pacific, with headquarters at Cedar Rapids, Iowa, was announced in the May issue, was born in the Creek Nation reservation of the Indian Territory (now part of Oklahoma) on November 19, 1898, and entered railway service on June 10, 1914, in the car department of the Rock Island shops at Chickasha, Okla. On February 18, 1918, he transferred to the bridge and building department on the Oklahoma division as a carpenter and in June, 1923, he was appointed pile driver and derrick car operator. Mr. Bond was promoted to bridge and building foreman on August 7, 1926, and served in that capacity on the Oklahoma and Southern divisions until his recent promotion, effective April 16.

Obituary

William Christian Kegler, engineer of track and roadway of the Cleveland, Cincinnati, Chicago & St. Louis (Big Four), with headquarters at Cincinnati, Ohio, whose death on May 6 was announced in the June issue, was born at Bellevue, Iowa, on March 22, 1877, and graduated in civil engineering from Notre Dame University in 1898. He entered railway service on June 22, 1903, in the engineering department of the Big Four and served in various positions, including that of engineer maintenance of way of the St. Louis division. In April, 1917, he was transferred to the Cleveland-Indianapolis division, and during Federal control from August, 1918 to 1919, he served as district engineer in charge of construction, returning to his former position at the end of that period. In June, 1923, Mr. Kegler was advanced to engineer of roadway and track, with headquarters at Cincinnati, the position he held until his death.

Wesley C. Brown, district engineer on the Missouri-Kansas-Texas, with headquarters at Denison, Tex., whose death on March 10 was reported in the May issue, was born at Denton, Tex., on December 16, 1889, and attended the University of Texas. He first entered railway service during the summer of 1913 as a rodman on valuation work for the Katy, returning to that road in June, 1915, as a rodman in the maintenance of way department. Mr. Brown was promoted to assistant engineer in December, 1915, and on January 1, 1921, he was advanced to office engineer at Dallas, Tex. He was appointed assistant engineer again in 1926, and on March 9, 1939, he was advanced to district engineer, with headquarters at Denison, the position he held until his death.

Harry Bell Reinsagen, retired assistant chief engineer of the Ohio Central Lines of the New York Central, with headquarters at Cleveland, Ohio, whose death on March 1 was reported in the May issue, was born at Cincinnati, Ohio, on September 17, 1872, and entered railway service on January 1, 1897, as an assistant engineer on the Lake Erie & Western (now part of the Nickel Plate). On January 1, 1906, he went with the Lake Shore & Michigan Southern (now part of the New York Central) as an assistant engineer and on January 1, 1910, he was promoted to first assistant engineer, with headquarters at Cleveland. Mr. Reinsagen was advanced to principal assistant engineer on September 1, 1912, and retained that position when the L. S. & M. S. was merged with the New York Central. On March 1, 1917, he was appointed engineer of maintenance of way, Lines West of Buffalo, with headquarters as before at Cleveland, and on March 16, 1921, he was reappointed principal assistant engineer at Cleveland. Mr. Reinsagen was promoted to assistant chief engineer on July 1, 1929, and continued in that position until his retirement.

Grier Ralston Smiley, chief engineer of the Louisville & Nashville, with headquarters at Louisville, Ky., died on June 10 at Miami Beach, Fla. Mr. Smiley was born at Moffatts Creeks, Va., on February 6, 1880, and graduated from Washington and Lee University in 1902. He entered railroad service as a rodman on the Hudson River division of the New York Central on September 1, 1902. Later he was made instrumentman, and on October 15, 1905, he was appointed a division engineer

Grier Ralston Smiley

on the Florida East Coast, later becoming superintendent of construction in charge of the Key West extension. He entered the employ of the Louisville & Nashville on May 28, 1912, as resident engineer in charge of the construction of the Winchester and Irvine branch. On July 15, 1915, Mr. Smiley went with the Nashville, Chattanooga & St. Louis as assistant engineer and as such was in charge of that road's interest in the construction of the Chicago, Burlington and Quincy-Nashville, Chattanooga & St. Louis bridge over the Ohio river, connecting Paducah, Ky., and Metropolis, Ill. He reentered Louisville & Nashville service on January 15, 1917, as special engineer, with headquarters at Bay St. Louis, Miss., which position he held until September 1, 1917, when he was appointed assistant engineer. On September 1, 1920, he was promoted to chief engineer of construction, and on April 1, 1931, he was further advanced to assistant chief engineer. On August 1, 1933, he was promoted to chief engineer, which position he held until his death. Mr. Smiley was a director of the American Railway Engineering Association, was president in 1936 of the Kentucky section of the American Society of Civil Engineers and served as a director from 1927 to 1933 and president in 1932 of the Engineers and Architects Club of Louisville, Kentucky.

Association News

Roadmasters' Association

With its annual convention, September 16-18, rapidly approaching, the Executive committee of the association will meet in Chicago on July 21 to review the work of the technical committees that are to report at the convention, and to make definite plans for the conduct of the convention itself. The 1940 Proceedings of the association are now on the press, and it is expected that they will be mailed to members early in July.

American Wood-Preservers' Association

At a meeting of the executive committee held in the Palmer House, Chicago, on June 25, preliminary arrangements were made for the next annual meeting, which will be held at Minneapolis, Minn., on January 27-29, 1942; assignments for personnel of committees were completed; and consideration was given to the possibility of changing the date of the annual meetings.

Bridge and Building Supply Men's Association

This association is looking forward to a large and constructive exhibit in conjunction with the annual convention of the American Railway Bridge and Building Association in Chicago, October 14-16, and, early in July, the secretary plans to send application blanks for exhibit space to the large number of companies manufacturing materials and equipment of specific interest to those in the bridge, building and water service departments of the railways.

Bridge and Building Association

President H. M. Church has called a meeting of the Executive committee in Chicago on July 28, at which time, in addition to taking up other business preparatory to the convention, to be held in Chicago, October 14-16, the chairmen of the various technical committees will present their reports for review prior to presentation before the convention.

The 1940 Proceedings of the association, delayed as the result of the adoption of new typographical standards, are now in the hands of the printer, and it is expected that they will be mailed to members by the middle of July.

Track Supply Association

Indicating a wholesome response to the increased activity in all branches of railway maintenance, 51 companies manufacturing and selling equipment and materials required for track construction and maintenance, have already made application for 76 spaces at the annual exhibit of the Track Supply Association to be held at the Hotel Stevens, Chicago, on September 15-18, in conjunction with the annual convention of the Roadmasters' and Maintenance of Way Association.

This is two more companies and applications for eight more spaces than were re-

(Continued on page 504)

They Anticipated PRESENT DEMANDS

Machine is light in weight—can be removed from track by its operator in 10 seconds.

and are Reaping the BENEFITS

Railroads That Are Utilizing WOOLERY TIE CUTTERS

are completing this season's tie renewal program weeks ahead of schedule . . . a mighty important advantage in these high-pressure days of heavier traffic . . . faster trains . . . greater interference with trackwork . . . and increased demands for labor on other essential jobs.

And, of course, the money saving of 30% or more . . . as proved by experience last year in the renewal of over 2,000,000 ties, . . . will be especially welcome in view of *this year's* enlarged maintenance program.

Why not speed-up YOUR tie renewals during the remainder of this season . . . get greater output per man . . . save money . . . with WOOLERY TIE CUTTERS

We will gladly demonstrate—YOU check the results. Send for 12-page Booklet.

Old tie is cut in three pieces which are easily lifted out (not dug out) by one man. Above is shown center section of old tie being removed. The crib is not disturbed and the new tie will rest on compacted bed of old tie. Retamping is practically eliminated. Track surface is not affected.

WOOLERY MACHINE COMPANY

MINNEAPOLIS Pioneer Manufacturers of MINNESOTA

RAILWAY MAINTENANCE EQUIPMENT

TIE CUTTERS • SWITCH HEATERS • MOTOR CARS

RAILWAY WEED BURNERS • BOLT TIGHTENERS

ceived at this time a year ago, and, with a considerable number of applications pending, it is expected that all previous records will be broken for both the number of companies exhibiting and the space occupied. Further applications should be addressed to Lewis Thomas, secretary-treasurer, Track Supply Association, 59 East Van Buren Street, Chicago.

The board of directors of the Association met at Chicago on June 18 to perfect plans for the exhibition, to allot space to those who had made reservations to that date, to plan means for stimulating attendance at the exhibition and to arrange for the dinner on Wednesday evening, which has been such a delightful feature of the convention for many years. Reservations for space thus far have been made by the following companies:

Air Reduction Sales Co.	New York
American Fork & Hoe Co.	Cleveland, Ohio
Armco Railroad Sales Co.	Middlet'n, Ohio
Barco Manufacturing Co.	Chicago
The Buda Company	Harvey, Ill.
Chicago Pneumatic Tool Co.	New York
Chipman Chemical Co., Inc.	Bound Br'k, N.J.
The Creepcheck Co., Inc.	Newark, N.J.
Crerar Adams & Co.	Chicago
Cullen-Friestedt Co.	Chicago
A. P. De Sanno & Son, Inc.	Phoenixville, Pa.
The Duff-Norton Mfg. Co.	Pittsburgh, Pa.
Eagle Grinding Wheel Co.	Chicago
Elastic Rail Spike Corp.	New York
Electric Tamper & Equipment Co.	Ludington, Mich.
Fairmont Railway Motors, Inc.	Fairmont, Minn.
Hayes Track Appliance Co.	Richmond, Ind.
Ideal Power Lawn Mower Co.	Lansing, Mich.
Illinois Malleable Iron Co.	Chicago
Ingersol-Rand Co.	New York
O. F. Jordan Co.	E. Chicago, Ind.
Joyce-Cridland Co.	Dayton, Ohio
Kalamazoo Railway Supply Co.	Kalamazoo,Mich.
Link Belt Speeder Corp.	Chicago
The Lundie Engineering Corp.	New York
Maintenance Equipment Co.	Chicago
Mall Tool Co.	Chicago
Morden Frog & Crossing Works	Chicago
Moto-Mower Co.	Chicago
Nordberg Mfg. Co.	Milwaukee, Wis.
Northwestern Motor Co.	Eau Claire, Wis.
The Oxweld R. R. Service Co.	Chicago
Oliver Iron & Steel Co.	Pittsburgh, Pa.
Positive Rail Anchor Co.	Chicago
The P & M Company	Chicago
Pettibone-Mulliken Corp.	Chicago
Pocket List of Railroad Officials	New York
Power Ballaster Co.	Chicago
The Q & C Company	New York
The Rail Joint Co., Inc.	New York
The Rails Company	New Haven, Ct.
Ry. Engineering & Maintenance	Chicago
Railway Purchases & Stores	Chicago
Railway Track-Work Co.	Philadelphia, Pa.
Ramapo Ajax Division of the Amer. Brake Shoe & Foundry Co.	New York
Sperry Rail Service	Hoboken, N.J.
Templeton, Kenly & Co.	Chicago
Warren Tool Corp.	Warren, Ohio
Woodings Forge & Tool Co.	
Woodings-Verona Tool Works	Verona, Pa.
Woolery Machine Co.	Minneapolis
Worthington Pump & Machinery Corp.	Harrison, N.J.

American Railway Engineering Association

Six committees of the association held meetings during June, and four committees plan meetings during July. The committees which met in June were Roadway and Ballast, at Toronto, Ont., on June 2 and 3; Track, at Chicago, on June 12; Yards and Terminals, at Cleveland, Ohio, on June 16; Buildings, at New York, on June 23 and 24; Highways, at Chicago, on June 24; and Economics of Railway Location and Operation, at Toronto, Ont., June 26 and 27.

The committees which have scheduled meetings in July are Economics of Railway Labor, which will meet at Minneapolis, Minn., on July 9, and make an inspection trip between Minneapolis and Duluth, Minn., on July 10; Water Service, Fire Protection and Sanitation, which will meet at Chicago, on July 10; Iron and Steel Structures, which will meet at Montreal, Que., on July 17 and 18; and Maintenance of Way Work Equipment, which will meet at New Haven, Conn., on July 21 and 22.

The 1941 Proceedings, reporting the activities of the convention of the association last March, were mailed to members during the last month, this volume, with 1166 pages, being the largest since 1934. The loose-leaf supplements to the Manual, comprising 148 sheets, have been approved by the General committee of the Engineering division, and their mailing to holders of the Manual awaits only approval by the Operations and Maintenance department of the Association of American Railroads.

Supply Trade News

Personal

V. P. Rumely, works manager of the Chicago plant of the **Crane Company,** Chicago, has been elected vice-president in charge of manufacturing.

Norman L. Deuble, formerly assistant to the vice-president of the **Copperweld Steel Company,** Warren, Ohio, has been appointed manager of sales.

A. W. Parker, a consultant on engineering matters in the advertising department of the **Worthington Pump and Machinery Corporation,** Harrison, N.J., has retired after 54 years of continuous service.

R. M. Cleveland has been appointed manager of the Boston, Mass., office of the **Worthington Pump & Machinery Corporation,** to succeed **W. A. Finn,** who has been called to active duty with the United States Navy.

E. C. Gunther, formerly a buyer in the purchasing department of the Chicago, Burlington & Quincy, has been appointed district manager, midwest territory, of the **Duff-Norton Manufacturing Company,** with headquarters at Chicago, to succeed **Alex S. Anderson,** whose death on April 29, was reported in the June issue.

Obituary

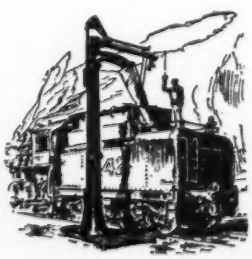
Robert M. Peterson, assistant advertising manager of the **American Steel & Wire Co.,** died suddenly on May 30, at Scottdale, Pa.

Harry S. Hart, president of the Rodger Ballast Car Company, Chicago, died in that city on May 27. Mr. Hart was born at Clinton, Ia., on September 2, 1870. After graduating from Rose Polytechnical Institute, Terre Haute, Ind., in 1893, he entered the employ of the Siemens & Haske Electric Co., as a construction engineer, and six months later resigned to become eastern manager of the Crouse-Tremaine Carbon Company at New York. In 1899 he became associated with the Rodger Ballast Car Company and in 1900 was promoted to secretary. Two years later he was advanced to vice-president and general manager and in 1906 was elected president. At the time of his death he was also president of the National Dump Car Company. When business no longer required his entire attention he devoted himself to civic improvements. He was also interested in the arts and languages and studied painting and French literature.

Harry S. Hart

Robert L. Cairncross, district sales manager of the Track Spring Washer division of the National Lock Washer Company, Newark, N.J., with headquarters at Chicago, died in Tucson, Ariz., on June 13. Mr. Cairncross was born at Shakespeare, Ont., on December 28, 1868, and as a boy worked on the Canadian Pacific in British Columbia, later serving on the Gulf, Colorado & Santa Fe as a conductor, and for a short time as a trainmaster on the Beaumont division of that road. In 1909 he left the G. C. & S. F. to go with the Handan-Buck Manufacturing Company, St. Louis, Mo., and in 1914 he went with the National Lock Washer Company, in its Track Spring Washer division, at Chicago. Mr. Cairncross was later advanced to district sales manager of that division, which position he held at the time of his death.

Robert L. Cairncross



ALPHABETICAL INDEX TO ADVERTISERS

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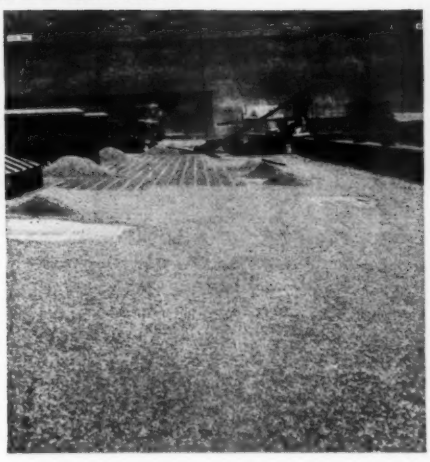

2. Divide the cost of a re-roofing job by 20, 30 or 40 and compare this with the year-after-year expenditures you pour into a roof that requires continual patching and re-patching.

3. This Koppers Roof, laid over an old roof carries a bond which protects the building owner against any expense occasioned by ordinary wear and tear on his roof for 20 years.

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- ☐ "How to Measure Depth of Pressure Treatments"
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